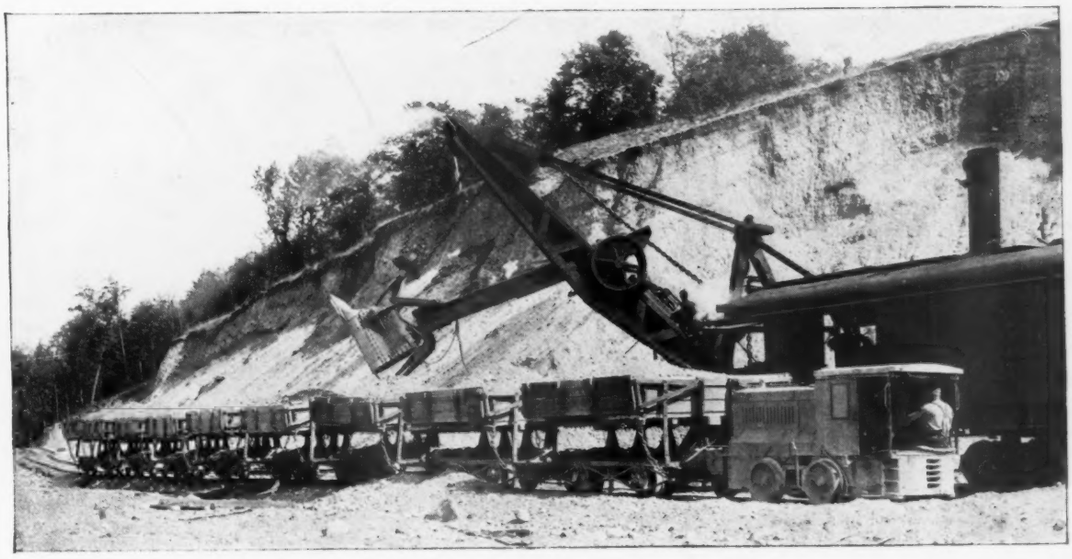
DEC 1 1924

Rock Products

With which is Incorporated CEMENT ENGINEERING NEWS

Founded 1896

Chicago, November 29, 1924 (*Issued Every Other Week*) Volume XXVII, No. 24



Another Big, Modern Plant Chooses Plymouth

A. W. Robertson, Ltd., of Tweed, Ontario, has recently completed a big modern sand and gravel plant, with a capacity of 2000 tons a day. A unique feature of the 400-acre deposit is that at least half of it is in the form of a hill 225 feet high. The pit is a side-hill cut about 75 feet up the slope.

The equipment is the last word in efficiency and naturally the Plymouth Gasoline Locomotive was chosen to assume the haulage burden.

Read now the letter in adjoining panel from Mr. Tummon,—then write for Bulletins "C" and "F" showing what others are doing in your field.

THE FATE-ROOT-HEATH COMPANY
Plymouth Locomotive Works
PLYMOUTH, OHIO

A. W. ROBERTSON, LTD.

Tweed, Ont., Sept. 20, 1924.

The Fate-Root-Heath Co.
Plymouth, Ohio.
Gentlemen:

We are using a PLYMOUTH 7-ton Gasoline Locomotive for hauling ten 6-yd. standard gauge dump cars from our pit shovel to dumping trestle. We also handle at our loading bins two and three open-top steel railway cars each loaded with 50 to 60 tons; also six empty railway cars up a one per cent grade, one mile in length.

Gasoline consumption per 10-hour day, working continuously, does not exceed 10 gallons.

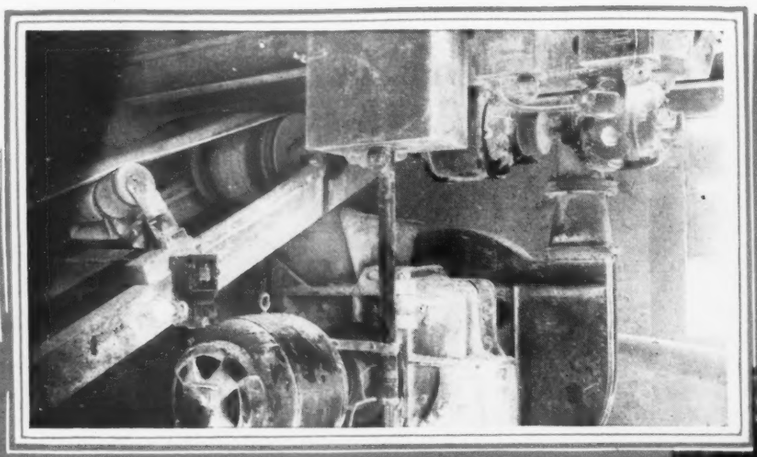
We have had several years' experience with steam locomotives up to four side wheels and for our work would not think of making any other installation than PLYMOUTH Gasoline Locomotive.

A. W. ROBERTSON, LTD.
(Signed) W. E. Tummon,
Manager.

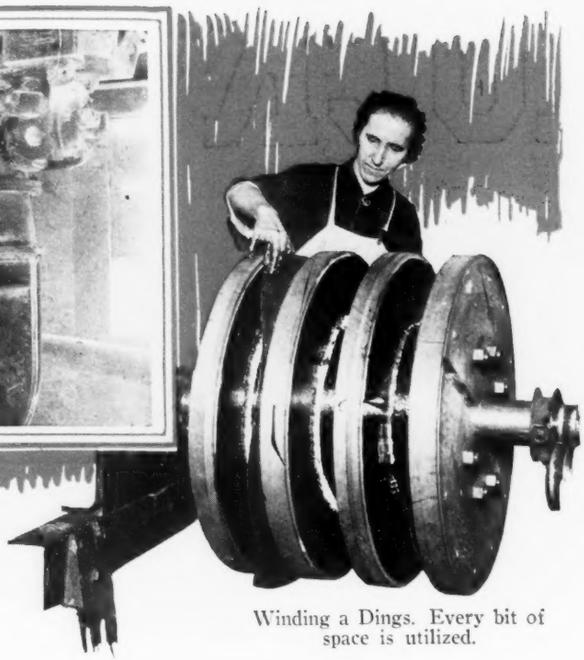
PLYMOUTH
Gasoline Locomotives

MEMBER A.B.C. *The Only Paid Circulation in this Industry* MEMBER A.B.P.

Next Issue Will Be December 13



The Sand Lime Products Co. of Detroit own the pulley shown at the left. They find that the right pulley saves when it comes to crusher protection.



Winding a Dings. Every bit of space is utilized.

You can't stop tramp iron with air and waste spaces!

THE weight of a magnetic pulley is an absolute indication of its strength. It takes plenty of material to create magnetic flux—the power that reaches out to turn damaging tramp iron aside, protecting your grinding equipment—and when plenty of material is used you are bound to have a heavy pulley.

In the Dings every bit of available space is used for steel and wire in correct proportions to give the greatest possible strength—and the weight proves it.

The result is Dings "High Intensity" capable of seizing every bit of iron that passes over the pulley, making the protection with a Dings practically 100%.

Over 4000 pulleys now in use, many of them having given years of service, are proving the value of Dings better construction.

Dings Magnetic Separator Co., 803 Smith Street, Milwaukee, Wis.

Send for free descriptive booklet.

Firm.....

Address.....

Att'n.....

To Dings Magnetic Separator Co.,
803 Smith St.,
Milwaukee, Wis.

RPII—29S—RTG

Dings High Intensity MAGNETIC SEPARATION

NEW YORK
52 Vanderbilt Ave.
PITTSBURGH
1522 Oliver Bldg.
CHICAGO
115 S. Dearborn St.
CLEVELAND
Leader-News Bldg.
DENVER
1718 California St.
ST. LOUIS
611 Granite Bldg.
CINCINNATI
Mercantile Lib'y Bldg.
RICHMOND
2106 E. Main St.
DETROIT
805 Hammond Bldg.
BIRMINGHAM
513 N. 21st St.
BUFFALO
988 Ellicott Square
LOS ANGELES
San Fernando Bldg.
SAN FRANCISCO
419 Call Bldg.
SALT LAKE CITY
201 Dooly Block

Rock Products
With which is Incorporated CEMENT and ENGINEERING NEWS
Founded 1896

Vol. XXVII | Chicago, November 29, 1924 | Number 24

Makes Cement From Oyster Shells and Clay

Redwood City Plant of the Pacific Portland Cement Company, Consolidated, Is Declared to Be the Last Word in Cement Mills

By Charles W. Geiger
San Francisco, California

THE new plant of the Pacific Portland Cement Co., Consolidated, located on the shore of San Francisco bay at Redwood City, has been called by visiting cement mill experts the last word in cement mill construction. All structures are of concrete so far as possible and the materials in the process of manufacture are handled by the straight line method, requiring a minimum of transportation from the time they are received until the finished product is ready for shipment.

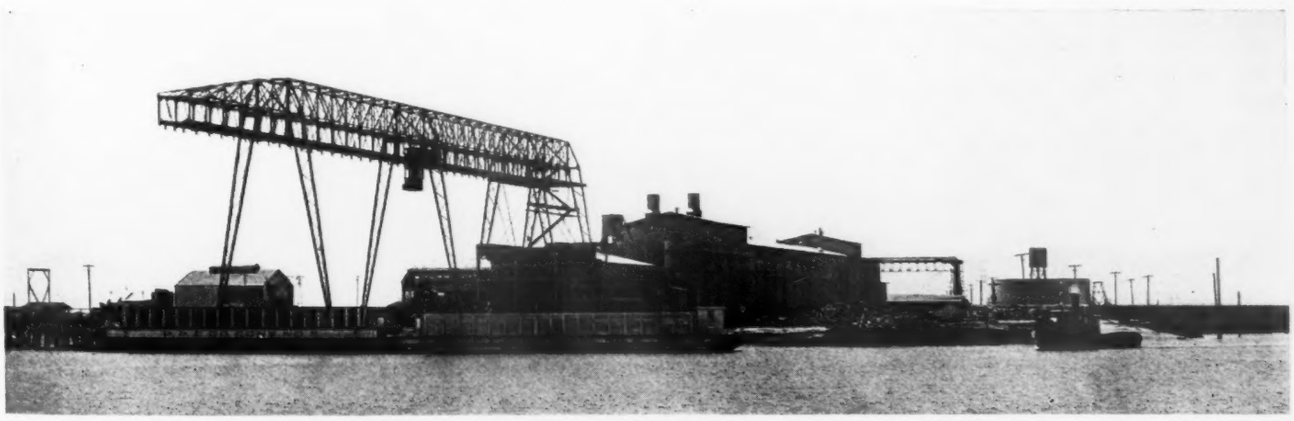
The initial capacity of the plant is 2500 bbl. per day. However, the design of the plant is such that as business conditions warrant, which will come about by natural development of the territory served by the company, additional units may be added without interfering with production.

The transportation of the finished product will be by both land and water. The Southern Pacific railroad has taken over and rehabilitated the branch railroad constructed by the Redwood City Harbor Co. and extending from their main line tracks in Redwood City to the site of the cement plant, while the cement company has constructed a dock in Redwood channel and has dredged the harbor to a depth of 30 ft., so that in addition to being able to barge the finished product to all San Francisco bay and tributary river points, the plant can load for coastwise and transpacific shipment at its own docks.

The Pacific Portland Cement Co., Consolidated, since its organization in 1901, has operated a cement plant at Cement, Solano county, where 500 men (including those at the Auburn quarry) have been constantly employed. The operating force at Redwood City plant will be approximately 100 men for the initial unit, not including those employed on the dredge, barges and tow-boats. The fact that the plant can operate with so small a force is occasioned by the absence of quarrying operations and the installation of labor-saving devices.

In 1911 the company opened its limestone quarry on the American river, to supply additional lime rock to the plant at Cement and high-grade limestone to sugar and steel mills. This quarry and the mill at Cement will be operated in the same manner as heretofore, except that increases in the company's business will be taken care of by the plant at Redwood City.

In addition to cement manufacturing, since 1912, this company has been the leading producer of gypsum products on the Pacific Coast, and in May of 1924 opened a new



General view of the Pacific Portland Cement Company's plant at Redwood City, California, showing the traveling crane that handles the shells and silt from the barges, and the storage bins

The silt and shells are stored in circular concrete pits 86 ft. in diameter

plaster mill at Gerlach, Nevada (described in ROCK PRODUCTS for November 1). This mill represents an investment of $1,500,000 and supplies the company's brand of gypsum products, and agricultural gypsum to northern California, Oregon, Washington and Nevada. The company is at the present time completing another plaster mill in the Imperial Valley, near El Centro, which represents an investment of $1,000,000. This mill will supply the company's gypsum products to Southern California, Arizona, New Mexico and Texas.

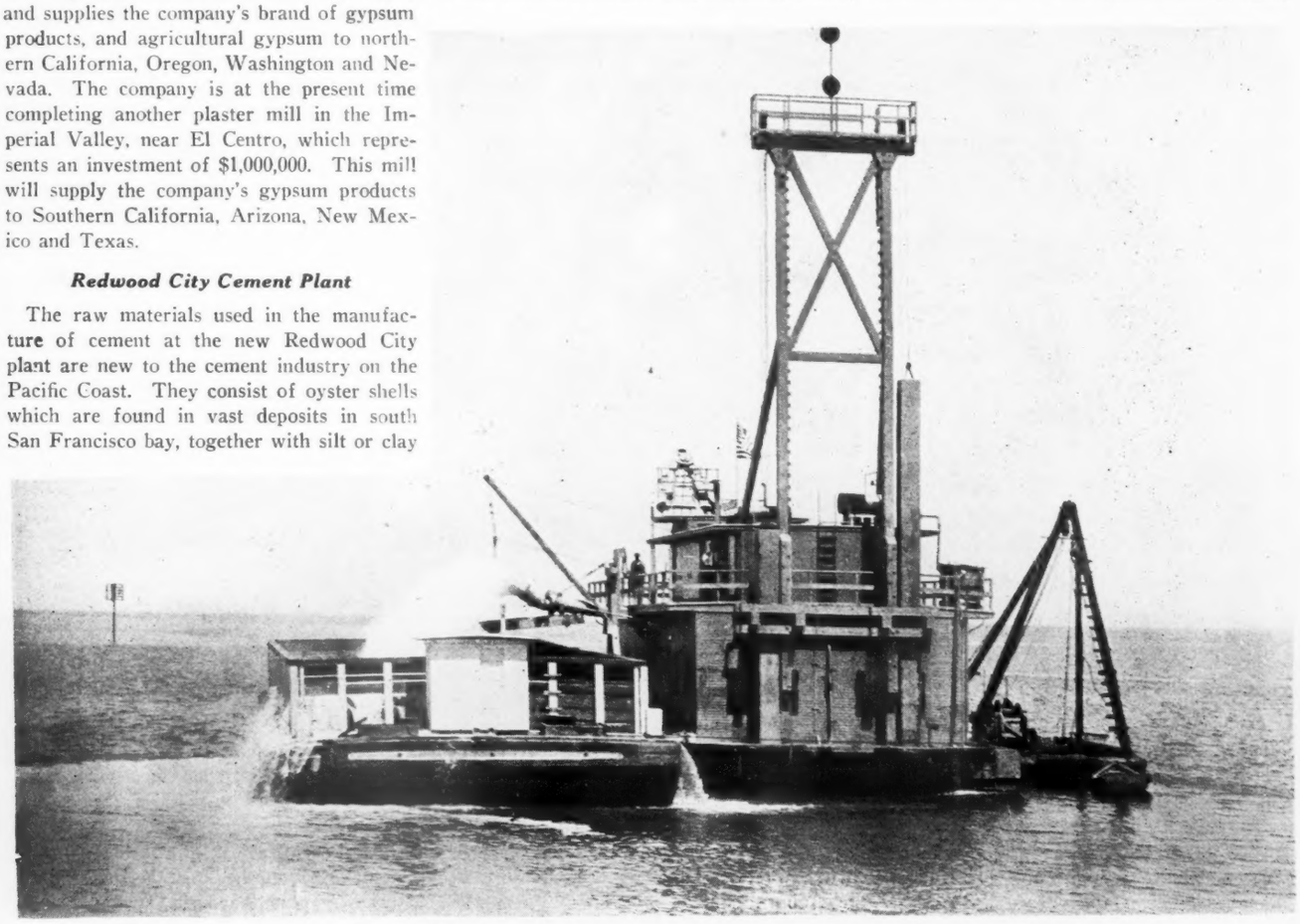
Redwood City Cement Plant

The raw materials used in the manufacture of cement at the new Redwood City plant are new to the cement industry on the Pacific Coast. They consist of oyster shells which are found in vast deposits in south San Francisco bay, together with silt or clay washed down from the surrounding hills. [Shells are used for making cement by the Texas Portland Cement Co., Houston, Texas, and will be used at the new Phoenix plant at New Orleans.—Ed.]

The oyster shells are nearly pure carbonate of lime and the other necessary elements—silica, alumnia and iron—are contained in the clay in proper proportions for cement making. These shell and clay beds were acquired by the cement company several years ago and embrace over 30,000 acres and practically cover the entire floor of south San Francisco bay and the company's engineers estimate that there is a sufficient quantity of raw materials to supply the plant for several hundred years.

The shells and clay are excavated from the floor of the bay by means of a suction dredge (specially designed and built for this purpose) through a 16-in. pipe to barges alongside the dredge and conveyed to the unloading wharf at the plant. This dredge with a force of six men replaces the usual 75 to 100 men required for quarrying operations where limestone is used as a raw material and its operation is cheaper than the usual quarrying expense, which includes blasting, steam shovel loading and the crushing of large pieces of rock.

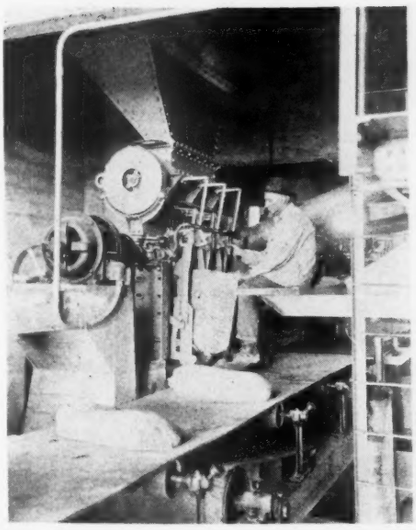
The contents of the barges are unloaded into concrete storage pits by a traveling crane. This same crane takes the material from the storage pits and places it in bins from which it is conveyed to the grinding



The shells and silt from which the cement is made are pumped from the bottom of San Francisco bay

mills by means of screw conveyors. One thousand tons of this material are handled per day. These raw grind tube mills reduce the shells and clay to a slurry. Conveyors take the slurry from the mills to silos or slurry tanks. Here the contents of the tanks are analyzed, and the material pumped from one tank to another and into the blending tanks until the exact mixtures desired are obtained. The kilns make one complete turn in 180 seconds. The fuel is oil, finely atomized and blown into the kiln under regulated pressure. The heat reaches in the burning zone, a temperature of from 2300 to 3000 deg. F. Over 300 bbl. of oil are consumed in each kiln daily.

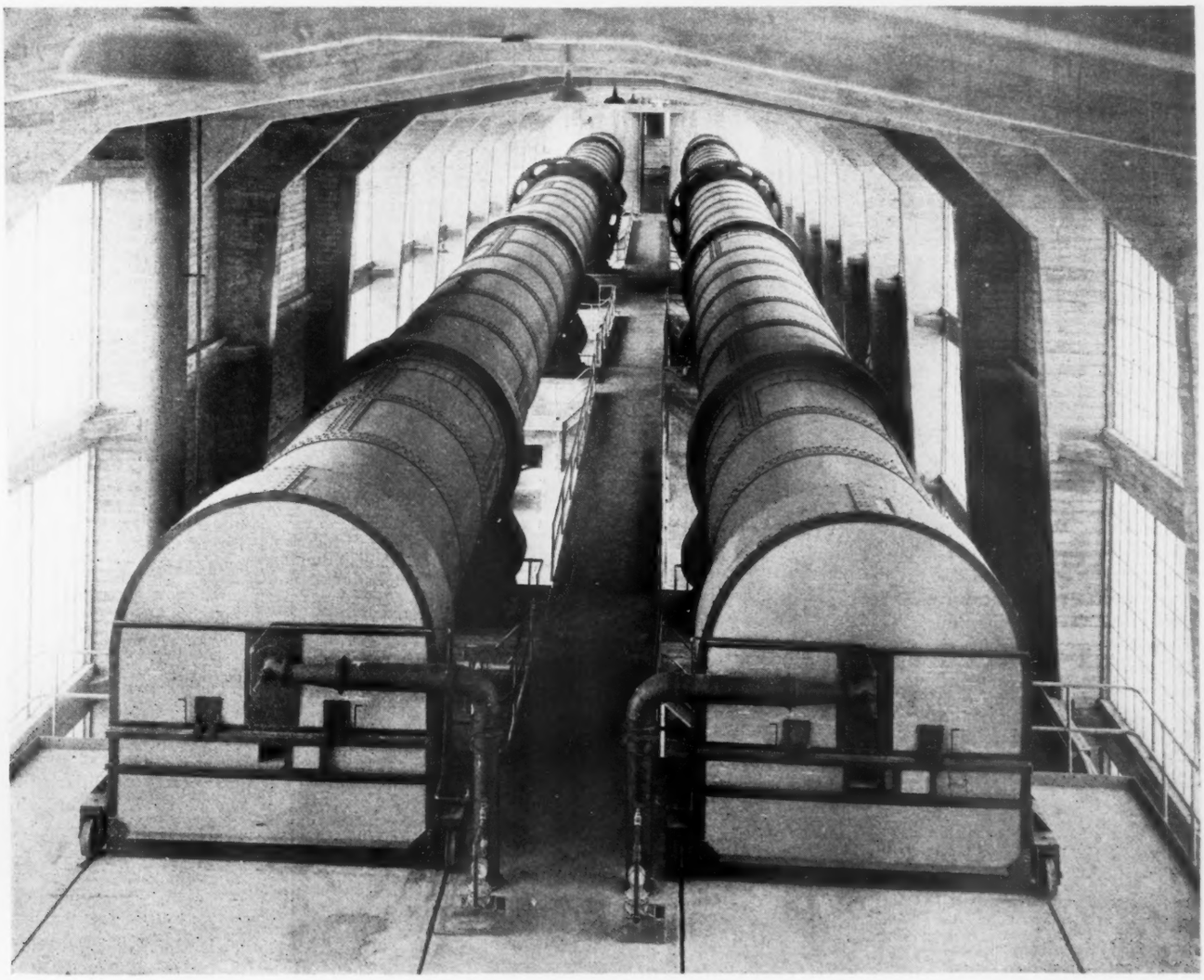
One of the accompanying photos shows the interior of the kiln room. The kilns are 10 ft. in diameter and 238 ft. long supported upon four carrying rings. Another shows the unloading crane for bringing material from the barges into the mill or storage. This crane is of the two rail trolley type, high speed, with clamshell bucket of 4 yd. capacity. From the ground line to the track is 68 ft. The total length is 340 ft. As the



The bags are filled and then carried away by the belt conveyor shown

mill feed bins could not be constructed of a capacity sufficient to insure continuous operation of the mill, it was necessary to provide ground storage of raw material. This was obtained by sinking two reinforced concrete cylinders each 86 ft. in diameter and 30 ft. deep. One of these cylinders was placed in each of the two bays under the trolley crane structure.

The supporting stratum of ground under the mill is a bed of clay several hundred feet thick. The top of this clay bed is 30 ft. below the normal ground line, this 30 ft. in depth being soft, mushy silt that has been deposited by flood waters from the mountains. It is so soft that a horse cannot walk over it. The main bed of clay underneath the silt is rather soft on the top, but quickly hardens into a solid stiff clay as the depth is increased. After prospecting with drill holes and test piles it was decided that fir piles 80 to 85 ft. in length would give the required support. By means of reinforced beams, caps and slab construction the main floor of the mill was brought up well above water level. Due to the heavy loads it was found more economical to use the beam and slab construction than to make a



The kilns, which are 235 ft. long, with an internal diameter of 10 ft. Note oil burners and the tight connection made with burner and kiln

concrete pile extension, and as a consequence the bottom of the concrete beams are down below ground water level. The plant is practically earthquake and shock proof, as it could only move as a mass. The building covering the mill machinery is made entirely of reinforced concrete and steel sash.

In addition to the necessary machinery required throughout the manufacturing plant there are provided washrooms with hot and cold flowing water, toilets and drinking fountains and garages for the workers who drive motor cars.

Engineering and construction were done by the Pacific Portland Cement Co., J. C. Buckbee Co., Chicago, being consulting engineers. The kilns, coolers and compeb mills were furnished by the Allis-Chalmers Manufacturing Co.; the compebs are driven by Allis-Chalmers synchronous motors, and all other motors are the General Electric Co.'s. Allis-Chalmers slurry pumps and compressed air system of slurry agitation are used. The compressors were furnished by the Sullivan Machinery Co. The dredge was built by the Union Iron Works, San Francisco. The crane was built by the Pawling and Harnischfeger Co., Milwaukee, Wis., after designs by the J. C. Buckbee Co.

The contractor on structures was the Foundation Co. The building of the concrete pits was unusual. They are probably the largest reinforced-concrete caissons ever sunk. They were poured inside of a fixed steel ring form and allowed to sink of their own weight; as new concrete was poured the hardened concrete below slid out of the form into the ground. When the caissons were sunk to grade the mud was taken out by clam-shell bucket and sent through the mill as raw material.

Celebrates 100 Years of Portland Cement

Chicago Meeting of Portland Cement Association Attended by Prominent European Manufacturers and Many American Pioneers

THE annual meeting of the Portland Cement Association in Chicago on November 17, 18 and 19 was the official American celebration of the 100th anniversary of the invention of portland cement. During the previous summer representatives of the association, including President F. W. Kelley, General Manager Wm. M. Kinney and several prominent manufacturers had attended a celebration in England, where a memorial bronze tablet in memory of Joseph Aspdin, the gift of the association, was unveiled at Leeds.

A special program in commemoration of this anniversary on November 19 included addresses by Blaine S. Smith, president-elect; F. W. Kelley, retiring president; Dr. A. N. Talbot, professor of theoretical and applied mechanics, University of Illinois, officially representing the American Society of Civil Engineers; Charles E. Fox, president of the Illinois Society of Architects, representing the American Institute of Architects; H. R. Safford, vice-president of the Chicago, Burlington & Quincy R. R. Co., representing the American Railway Engineering Association; P. H. Bates, chief of the section, structural engineering and miscellaneous materials, representing the United States Bureau of Standards; Richard L. Humphrey, consulting engineer, Philadelphia, Penn., representing the American Society for Testing Materials; A. E. Lindau, president of the American System of Reinforcing, representing the American Concrete Institute; Edward N. Hines, chairman of the board of county road commissioners of Wayne county, Michigan, representing road builders and highway officials generally.

Blaine S. Smith, newly elected president of Portland Cement Association

Each of these speakers contributed something of interest to the history of cement and of its use in concrete construction. Mr. Fox, in his discussion of the use of cement in architecture, made some remarks of interest to aggregate producers as well as cement manufacturers. He said one reason for concrete not being more used in architecture was a lack of surfacing or finish pleasing to architectural tastes; and another reason was the need for some lightweight aggregate.

Edward N. Hines gave a most optimistic picture of the future of concrete roads in a community that already has a greater mileage of this type than any other in this country of equal size. Wayne county is even now extensively engaged in widening pavements to double or more their original width, as well as continually adding new mileage to its remarkable concrete road system.

The development of the portland cement industry in Europe was described by Gustave Deroover, president, Union des Cimenteries, president, Groupement Professionel des Fabricants de Ciment Portland Artificiel de Belgique (Belgian Portland Cement Manufacturers Association); Dr. Peter Hans Riepert, president, Deutscher Zement Bund

(German Cement Association); Charles Candlot, representing the French Portland Cement Industry; Poul Larsen, president, Tunnel Portland Cement Co., England; Alborg Portland Cement Fabrick, Denmark; A. Holter, director-manager, Dalen Portland Cement Fabrick, Norway.

Technical Session

Research on the constitution of portland cement was a prominent feature in the technical discussions of the meeting. It will be recalled that during the current year the association has embarked on an extensive program of research work at the United States Bureau of Standards that will doubtless require several years to arrive at usuable findings and results. This work is being done by Dr. Robert H. Bogue and a staff of assistants under the general supervision of P. H. Bates.

One of the most difficult things in this study, according to Dr. Bogue, is to get the pure elemental minerals to study—the lime carbonate, silica and alumina. They already know that very small percentages of other minerals, which apparently act as catalysts, have very important effects on the properties of the resulting products. Just what these effects are is one of the chief objects to be attained. A part of this work includes a study of foreign literature on the subject and a compilation of a bibliography which will be of great value as the investigation proceeds.

Closely allied to the subject matter of the above discussion was a paper by Dr. Gustave Haegermann, director of the German Portland Cement Association laboratory on "High Early Strength Cements." This paper brought out, perhaps for the first time to many American portland cement manufacturers, that high early strength cements, or quick-hardening cements, are not necessarily high alumina cements.

European portland cement manufacturers, in order to meet the competition of alumina cements, in which the French have a practical monopoly, have given a great deal of study to improving, or changing the properties of, portland cement to give it some of the reputed virtues of high alumina cements. If this can be done, it is said, such early strength portland cements will not only be cheaper but be more acceptable to engineers, since to a certain extent high alumina cements are still an unknown quantity, while portland cement, with a hundred years' use behind it, is, of course, free from suspicion.

Dr. Haegermann's point of view is that high early strength portland cement will in the future be of increasing importance to the portland cement industry. It is not, he said, the mere question of producing high grade cements, but rather the maintaining of the reputation of portland cement, as the best in its class.

Portland cement may be given some of the quick strength properties of alumina cements by adding about 1% of iron ore or calcined iron pyrites; by fine grinding of the raw mix, or slurry; by more careful attention to burning; by using fuel as free from ash as possible; by fine grinding of the clinker. By one or more of these methods the high, early compressive strengths of alumina cements have not yet been reached, but tensile strengths have already been surpassed.

Dr. Haegermann's conclusion is that the scarcity of bauxite, the present expensive methods of manufacture and the reaction on other hydraulic cements militates against a general adoption of high alumina cements where high early strengths alone are considered, but that for structures in water containing gypsum or in sea water, the alumina cements will find an extensive use.

A paper by Helmuth Krarup, superintendent of the Hawkeye Portland Cement Co., Des Moines, Iowa, on "The Economic Limit and Operating Flexibility of Waste-Heat Boiler Installations" was complimented on all sides, not only for its completeness so far as waste-heat boiler operation was concerned, but for the comprehensive manner in which it covered nearly all phases of kiln operation. Indeed, a point brought out in this paper was that one of the chief benefits of a waste-heat boiler installation is the closer study and control of all kiln-operating conditions which such an installation makes necessary.

Perhaps Mr. Krarup's most significant conclusion is that he cannot conceive of a condition which would prevent any cement kiln in operation today, regardless of size or length, wet or dry process, being connected to a waste-heat boiler and failing to give sufficient steam to operate the plant, if the installation were properly made. One trouble, as was brought out in the discussion, is that frequently there is power to waste, since there are times when kilns are operated and some of the grinding machinery is not.

Both President Kelley and H. A. Schaffer, conservation engineer of the association, described some of their impressions of foreign cement plant practice. Apparently there is greater fuel economy in some European plants and more attention paid to dust collection or dust prevention. But most European cement plants use chalk and clay as raw materials so that economies and methods are possible that are not possible at American mills using limestone and shale.

Officers Elected

An interesting feature of the meeting was the presentation of a testimonial to the retiring president of the association—F. W. Kelley, president of the Helderberg Cement Co., Albany, N. Y., in appreciation of his achievements for the association. In his response he modestly and justly attributed a large part of these achievements under his administration to the untiring effort and work of the association staff.

Officers elected for the ensuing year are as follows: President, Blaine S. Smith, general sales manager, Universal Portland Cement Co.; first vice-president, Lowell R. Burch, vice-president, Atlas Portland Cement Co., New York City; second vice-president, C. A. Irwin, vice-president, Alpha Portland Cement Co., Chicago, Ill. John W. Boardman, Detroit, vice-president of the Huron and Wyandotte Portland Cement companies, was re-elected treasurer.

Prominent Foreign Guests

Among the European portland cement manufacturers who attended the meeting as guests of the association, in addition to those already mentioned, were:

Leon Dereme, Harmignies, Belgium, Societe Anonyme Ciments Portland Artificiels Belges.

J. Van den Heuvel, Hemixen, Belgium, Societe Anonyme des Ciments J. Van den Heuvel.

Dr. Nicolaus Simon, Oppeln, Germany, director of Portland Cement Co. of Groschowitz.

Dr. Heinrich Mueller, Kalkberge, Germany, president Vereins Deutscher Portland Cement Fabrikanten.

Dr. Phil E. Schott, Heidelberg, Germany, technical chemist and director, A. G. Heidelberg.

C. A. Moller, Copenhagen, Denmark, engineer, F. L. Smidth & Co.

Dr. Frederich Hubner, Balingen, Germany, director der Cement fabrik Balingen.

Dr. Carl Schwenk, Ulm, Germany, representing E. Schwenk Cementfabrik.

Ernst G. W. Pruessing, Nienburg, Germany, director, Pruessing & Co. (Portland Cement Manufacturers).

Illinois Bids on Concrete Roads

HARD road contractors have submitted bids at Springfield, Ill., for the second allotment of roads and bridges under the new $100,000,000 bond issue, approved November 4. Offerings comprised 164 miles of pavement in 23 counties, 33 miles of grading in four counties and 20 bridges in five counties.

Of the 164 miles of pavement, a little more than 20 miles is planned for Cook county—6.39 miles near Oak Lawn, three miles near LaGrange, 4.79 miles near Mannheim and 6.47 miles near Orchard Place, all part of route 46.

The first letting under the new bond issue was held November 12, when bids for 285 miles of paving, nine miles of grading and 18 bridges were opened. Because the vote cast for the bond issue proposition has not been canvassed officially declaring the bond issue approved, the department of public works and buildings has let none of the contracts. It will likely be two more weeks before any action is taken.—*Chicago Daily News.*

Largest of New England Gravel Plants

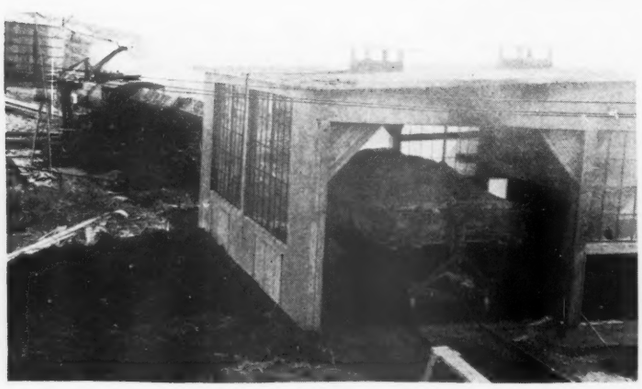
Boston Sand and Gravel Company's Bank Operation Has Many Noteworthy Features

THE Boston Sand and Gravel Co. is quite easily the largest producer in New England and its daily output of 5000 tons per day gives it a high rating among the producers of the country. It conducts two distinct and quite different operations. In one of these (as mentioned in the October 4 issue of ROCK PRODUCTS) it dredges three different kinds of sea sand from points along the Massachusetts "North Shore," between Salem and Boston. In the other it conducts a regular bank operation, digging the sand and gravel with steam shovels and washing it in a plant that has some unique and rather noteworthy features.

The plant is 10 years old—or at least it was acquired by its present owners 10 years ago. It is at Greenbush, a part of the old town of Scituate, 25 miles south of Boston by water. For several years it was famous as the only large plant in the country which did all of its sizing of sand and gravel on shaking screens. These were large affairs, 25 ft. long and 6 ft. wide. No particular fault was ever found with them as screening devices, the "shaker" being a most efficient screen so far as capacity per square foot of area is concerned. But, as usually happens, the effect of the shake on the building and on the screen supports was so marked that when these screens had to be replaced it was deemed better to install screens of the conventional revolving type.

The material of which the deposit is

Greenbush plant of Boston Gravel Co. The primary crushing plant is at the extreme right. The conveyor to the stock-piles may be seen at the left of the washing plant



Left—Train from the shovel discharging at plant hopper. Right—Primary crushing plant, with train at rear, and belt conveyor

composed is apparently of glacial origin, but it has been moved and redeposited by the action of waves and floods. The effect of this washing and moving has been to thoroughly clean and sort the material. So far as freedom from clay and other deleterious elements is concerned, much of the deposit might be dry-screened and sent at once to the cars. But water adds greatly to the screening capacity of the plant and is a sure preventive of any unfit material escaping into the stockpile, so the regular washing system is used. To further insure cleanliness a considerable portion of the deposit is stripped.

Two shovels are employed in the work of excavating, a Bucyrus, 70-ton railroad type machine, and a new Marion electric model 37. The latter was employed in development work when the plant was visited recently.

Two 30-ton Baldwin locomotives bring in four 12-yd. Western side-dump cars from the shovel to the track hopper, and the 27x27 ft. hopper has more than the full capacity of the train, avoiding loss of time in dumping. The cars are dumped on a bar grizzly made of 60-lb. rails with 6-in. spaces. This is set at a somewhat flat inclination (¾-in. to the foot) so that the boulders which do not pass have to be pushed off the grizzly to the jaw crusher by the man who attends to dumping the cars. From the grizzly these boulders are fed to an 11x22-in. Acme jaw crusher run by a 50 hp. Western Electric motor. The undersize of the grizzly falls into the track hopper from which it is fed to a 42-in. conveyor belt with 90 ft. centers. The crusher product falls on the same belt and both are conveyed together to the primary screen.

This screen was made by the Link-Belt Co. The main section of the screen has 4-in. holes and the jacket 2-in. holes. The oversize, between 4 in. and 6 in., goes to a 13-in. McCully gyratory crusher. The intermediate size, between 2 in. and 4 in., goes to a Symons disk crusher and all through 2 in. goes to a 36-in. conveyor, 206 ft. centers, that takes it to the washing and screening plant.

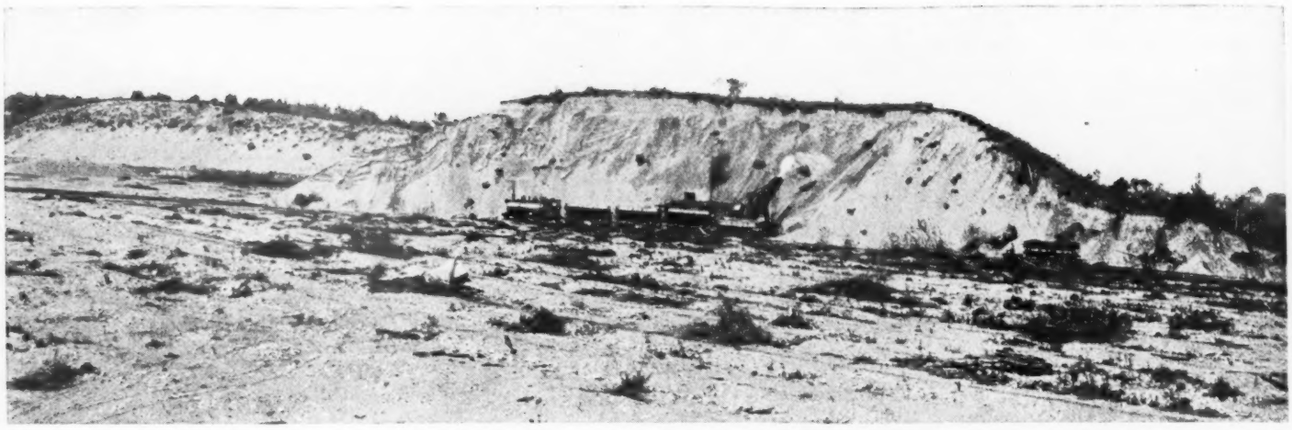
The product of both the gyratory and the disk crushers is returned to the track hopper by a 24-in. inclined belt conveyor with 85 ft. centers. Thence it passes to the 42-in. belt and back to the primary screen. In this way everything is kept in a closed circuit of the screen and crushers until it passes the 2-in. openings of the screen. The Symons disk crusher may be by-passed when this is desired.

The 36-in. conveyor takes the material—all passing 2-in.—to the washing and screening part of the plant. The screening is done by a Greenville jacketed screen which makes three products, sand which is all minus ⅜-in., fine gravel between ⅜-in. and 1⅜-in. and coarse gravel between 1⅜-in. and 2-in. The gravel falls

Other side of plant showing stockpiles and conveyor to dock. Blacksmith shop and office in foreground

Cut through sand bank and electric shovel mounted on crawler treads starting development work

Loading slip and docks and end of conveyor from stockpiles



Loading gravel trains with steam shovel at the bank

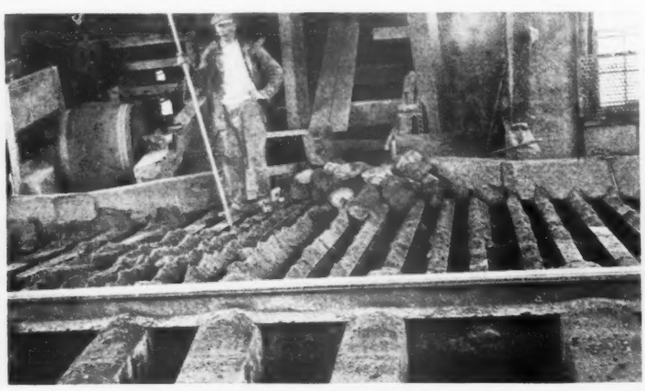
to two conveyor belts that take it to the plant stockpiles and the sand (and water) goes to a sand screen covered with 3/16x 1-in. Toncap screen cloth.

The sand screen makes a pea or fine roofing gravel, between ⅜-in. and 3/16-in. and minus 3/16-in. sand. The gravel falls on a conveyor belt that takes it to the stockpile and the sand goes to a settling box. This settling box is like that at the Roquemore plant described in the June 28 issue of Rock Products. Its inside dimensions are 28 ft. long, 11 ft. wide at the top and 2 ft. wide at the bottom and 10 ft. deep. The dewatered sand is discharged through five 6-in. pipe nipples which are closed and opened by manually operated gates. This sand falls directly to a stockpile.

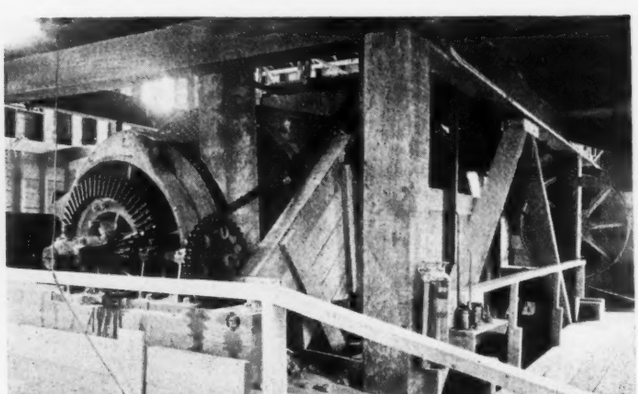
An 8-in. Gould centrifugal pump furnishes water for washing. River water is used, the supply being the dredged channel in which the barges are loaded. The water is added to the material at the gravel screen.

Under the stock piles there are two reinforced concrete tunnels 30 ft. apart. In each tunnel is a 30-in. belt conveyor with 350-ft. centers. The discharge end of these two conveyors overhangs the wharf so that steamlighters and scows can be berthed alongside for loading. The basin in front of the wharf will accommodate from 15 to 20 vessels, steamlighters, scows, and tugs.

The steam lighters act as tugs for the



Left—Grizzly. Note return conveyor at left. Right—Stockpiling conveyor and stockpile. Conveyors in tunnels underneath take the material to the docks

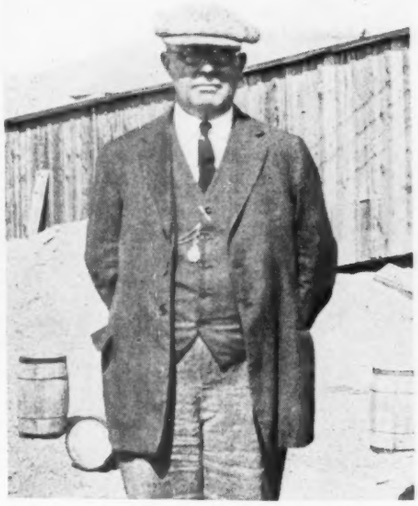


Left—Conveyors in primary crushing house. One of these goes to the washing plant, the other returns the crusher product to the grizzly. Right—Gravel screen in the washing plant

scows as well as carrying a load of their own. They are provided with a boom derrick and clamshell bucket with which they can unload barges and their own hatches. They can also dredge sand from the sea bottom.

The steam lighter comes into the basin with light scows in tow, which are berthed at one side. The lighter docks under the belt conveyors and receivs its load at a rate of 800 tons per hour from the two belts. The loaded lighter then takes two loaded scows and starts for Boston. After the lighters have left, the light scows are brought alongside and loaded preparatory to shipment on the following day.

The production of the plant is 3500 tons per day. The office of the plant is at 88 Broad street, Boston. P. P. Bird is president of the company, P. F. Ayer is secretary and S. B. Rowe is treasurer. D. A. Vines is superintendent in charge of operation at the plant.



D. A. Vines, superintendent

American Society for Testing Materials Standards

THE 1924 book of standards of the American Society for Testing Materials has just been issued. This is the regular triennial publication and contains the 220 standard specifications methods of test, definitions of terms and recommended practises in effect at the time of its publication. There are more than 1200 pages in the book, which covers many industries and a fair proportion of these are given to rock products. About 150 pages give the standard specifications for cement, lime, gypsum and clay products and about 60 pages are given to specifications for highway materials. All of these are familiar to those who have followed the work of the society since they have been published for one or more years as tentative specifications before being adopted as standards.

National Sand and Gravel Association Prepares for Convention

Executive Committee Meets in Terre Haute and Program Committee Announces Program for the Convention, January 6 and 7

THE executive committee of the National Sand and Gravel Association held a meeting at Terre Haute, Ind., November 18. This is in line with the policy of the association which is to hold executive committee meetings in different parts of the country so that the producers of each section may have a chance to become acquainted and to learn of the work which the association is doing.

The president, John Prince, and Directors Haddow, Shiely, Fletcher, Johnson and Sutton (these making up the committee) were all present with Executive Secretary T. R. Barrows.

Considerable routine business was attended to and there was naturally an informal discussion of the forthcoming convention and the activities of the association for the coming year. It seemed to be the opinion that the time had come for the association to do more promotional and educational work. Executive Secretary Barrows read a brief report showing how 132 special cases had been handled in Washington this year. This work has been so systematized and organized by the Washington office that it is now a matter of routine and more time and attention can be and should be given to purely educational and promotional work.

Several Indiana sand and gravel producers were present and were hosts of the committee at luncheon. Those who attended this luncheon were:

John Prince, Stewart Sand Co., Kansas City.
J. L. Shiely, J. L. Shiely, St. Paul.
Hugh Haddow, Menantico Sand Co., Millville, N. J.
E. Guy Sutton, Neal Sand and Gravel Co., Mattoon, Ill.
R. C. Fletcher, Flint Crushed Gravel Co., Des Moines, Iowa.
V. O. Johnson, Lincoln Sand and Gravel Co., Lincoln, Ill.
T. R. Barrows, executive secretary.

These being the executive committee, the Indiana producers who attended were:

Lee R. Witty (president Indiana Sand and Gravel Association), Wabash Sand and Gravel Co., Terre Haute, and James H. Swango, of the same company.
G. J. Nattkamper and J. P. Connelly of the Terre Haute Gravel Co., Terre Haute.
A. H. Brymer, Standard Sand and Gravel Co., Clinton.
H. E. Lane, Hazelton Sand and Gravel Co., Hazelton.
C. F. Neville, Western Indiana Gravel Co., Terre Haute.
O. K. Snyder, with Abe Hart, Sanborn.
A. J. Young, Covington Sand and Gravel Co., Covington.

At the luncheon everyone spoke informally and some interesting stories were told of valuable hints that had come from the interchange of ideas at conventions.

In the afternoon the committee resumed its work. Ben Stone of the Merom Gravel Co. and Frank Welsh, consulting engineer of the Greenville Gravel Co., visited the committee. Mr. Stone gave a dinner to the committee at the hotel that evening.

Meeting of Program Committee

The program committee of the National Sand and Gravel Association met at the office of the Chicago Gravel Co. on November 20 and adopted a program for the annual convention to be held in Chicago, January 6 and 7. This committee consists of: Frank Renwick, Chicago Gravel Co.; T. E. McGrath, McGrath Sand and Gravel Co., and V. O. Johnson, Lincoln Sand and Gravel Co., with John Prince, president, and T. R. Barrows, executive secretary. In connection with the program, the committee makes the following announcement:

"Sessions will commence promptly at 10 a. m., Tuesday and Wednesday mornings. There will be but one afternoon session—Tuesday—commencing promptly at 2:30. The complimentary annual dinner (informal) will be on Tuesday evening at 7 o'clock. The convention proper starts Tuesday morning and ends Wednesday noon. All producers, regardless of affiliation with the National Association, are cordially invited and urged to attend.

"The Road Show (where Wednesday and Thursday are the really important days)

may be quite thoroughly inspected during one afternoon. The convention program has been arranged so as to permit a visit to the Road Show on Wednesday afternoon. The Coliseum, home of the Road Show, is four blocks from the Auditorium hotel.

"In convening at Chicago on January 5, the National Sand and Gravel Association celebrates its birthday in the town where it was born. Under the present plan of organization of the association, the board of directors, at their annual meeting preceding the convention, disposes of the convention routine business, thus conserving the time of the convention proper and avoiding prolonged sessions. Many and varied phases of the sand and gravel industry will be discussed at the convention by men who are producers themselves and who speak from experience. A mutual exchange of ideas is thus afforded. Consideration will be given to activities for the association during the year 1925. Among such activities (you will at once note their importance and possibilities) are the following:

"Sand specifications in city building codes;

"Extending the use of gravel as railroad ballast;

"Workmen's compensation insurance rates in sand and gravel operations.

Reduced Passenger Rates

"The carriers have granted reduced rates of one and one-half fare for the round trip upon the certificate plan. In purchasing tickets, a certificate should be procured from the ticket agent, indicating that the purchaser is going to Chicago to attend the Road Show. These certificates must be presented at the registration desk, Auditorium hotel, for validation by the joint ticket agent for the carriers, on January 6. The certificates, properly validated and presented to the ticket agent, will entitle the holder when purchasing return ticket to one-half of regular fare."

PROGRAM OF CONVENTION

Monday, January 5

MORNING

10:00 Registration of members and guests on mezzanine floor of the Auditorium hotel.

12:30 Meeting of the board of directors, beginning with luncheon.

Among duties delegated to the board of directors by the constitution of the association, to be considered at the annual meeting of the board, are the following:

1. Preparation of plan of activities for the association during the ensuing year, and also a budget to cover such activities, for submission to the convention as a whole for approval.
2. Nomination of candidates for the offices of president, vice-president and secretary-treasurer, and also for three directors-at-large.
3. Selection from their own number of four members of the executive committee for the year 1925.

MONDAY AFTERNOON

2:00 Although the convention proper does not begin until Tuesday morning, January 6, there will be an informal program of interest on Monday afternoon. This, for the benefit of those producers who may be in Chicago on Monday.

Tuesday, January 6

MORNING

10:00 Address of welcome. John Sloan, president Board of Public Improvements, Chicago. Mr. Sloan will be introduced to the convention by F. W. Renwick, Chicago Gravel Co.

10:15 Annual address of the president.

10:30 Report of the secretary-treasurer.

10:45 Winter Concrete Construction. By a representative of the Portland Cement Association, Chicago.

11:15 Ten-minute talks on:

1. "Making 'SuperSand' from Gravel." Alex W. Dann, Keystone Sand and Supply Co., Pittsburgh.
2. "Making Sand from Surplus Gravel."
3. "Workmen's Compensation Insurance."
4. "Sand Specifications in City Building Codes."
5. "My Experience as a Manufacturer of Concrete Brick." A. P. Burke, Atlanta Sand and Supply Co., Atlanta, Ga.

(Members especially interested in any one of these topics are urged to get in touch with the speaker before leaving the convention hall.)

1:00 Adjournment for luncheon.

AFTERNOON

2:30 "What Are Legal Obligations of Carriers with Respect to Installation of Track Scales?"

3:00 Open forum for discussion of Operating Problems in the Sand and Gravel Industry.

The president will assign the different topics to producers familiar with the peculiar problems to be discussed.

These subjects may be discussed by the whole convention, or the convention may be divided into group meetings, as circumstances warrant.

Suggested topics for discussion at this open forum are:

1. Best type of power for digging equipment; steam, electric, Deisel oil, gasoline?
2. What discount rate for prompt collections?
3. Why a sand classifier?
4. Attempts of carriers to collect freight charges based on 10% above marked capacity of car in cases where estimated weights govern.
5. Demands for different size materials.
6. Overcoming river cutting into a bank.
7. Supplying sand and gravel for winter construction.
8. Economical winter storage of sand and gravel.
9. Costs and advantages of large sized storage stocks.
10. Unique system of plant haulage.
11. Competition of wayside pit materials.
12. Pumping with centrifugal operation.
12. Conveying and elevating.
14. Screening and washing.
15. Slackline cableway excavating.
16. Crushing oversize.
17. Getting material rfom bank to conveyor belt under main hopper.

TUESDAY EVENING

7:00 Annual dinner, Auditorium hotel (informal).
Orchestra music.
Dancing.
Professional entertainment.

C. A. Homer, Missouri Portland Cement Co., St. Louis, is chairman of the convention committee. Remembrances of the entertainment provided by Mr. Homer at St. Louis last year are still vivid in the minds of all.

Wednesday, January 7

MORNING

10:00 Address.

10:15 "Gravel as Railroad Ballast."

10:45 "Campaign for Clean Materials in Southern California." Lawrence L. Rogers, Union Rock Co., Los Angeles, Calif.

11:00 Report of Car Demurrage Committee. T. E. McGrath, McGrath Sand and Gravel Co., Lincoln, Ill., chairman.

11:30 "Methods of Repairing Bad-Order Cars and Suggested Methods of Relief from Inadequate Equipment." W. E. Rogers, Arkansas River Sand Co., Sand Springs, Okla.

12:00 Consideration of report of board of directors.

12:15 Reports of committees.

12:30 Annual election of officers.

1:00 Adjournment of the convention.

AFTERNOON

Visit to the Sixteenth National Good Roads Show at the Colisum.

Applies New Ideas to Phosphate Washing

Plant of the Charleston, S. C., Mining and Manufacturing Company Embodies Novel Methods of Handling and Cleaning the Product

THE new plant of the Charleston, S. C., Mining and Manufacturing Co. at Mount Pleasant, Tenn., has been built in the effort to solve the troubles of rock phosphate production on strictly engineering lines. Labor costs have been cut by building a large capacity plant and employing labor saving machinery wherever possible. Increased production has been secured by the same means. The recovery of commercial products has been increased by adopting improved methods of saving the fines and finally the grade of the product has been raised by adopting new methods of washing and cleaning the phosphate sands.

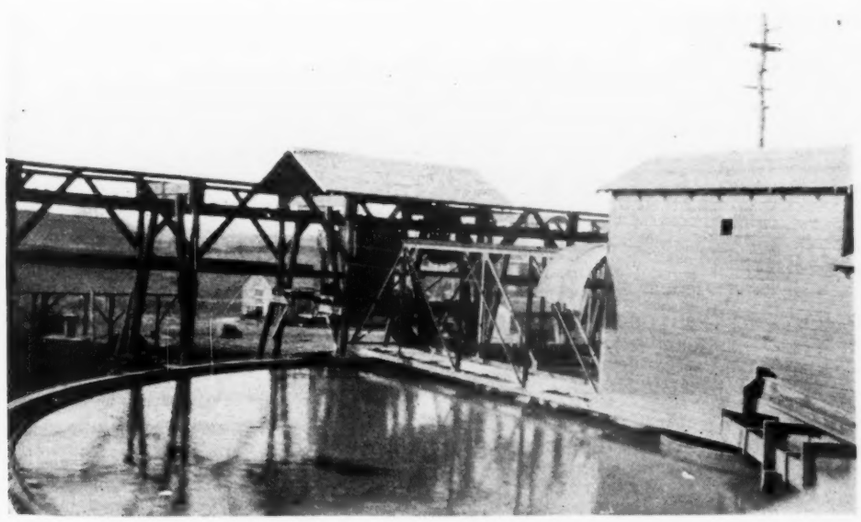
The plant is situated about a mile south of Mount Pleasant on the site of the old Arrow plant, which the new plant has succeeded. Indeed a considerable part of the machinery of the old plant is at work in the new one. The plant lies more or less on three sides of a square, the offices and machine shop on the east, the washer to the south and the dryers, grinding plant and new table house on the west, where the spur track that serves the plant comes in.

The "muck," as the crude material is always named in this field, is dug by drag lines and sent to the plant in 4-yd. side-dump cars. The cars come in on an elevated track and dump into the hopper shown in one of the pictures. The "muck" is sluiced from these hoppers by hydraulic "guns" which use a powerful jet of water to disintegrate the mass and wash away the clay. Any coarse pieces of limestone (which comes from the bottom of the deposit) brought in with the "muck" are picked out at this point.

There are two washing plants each with a capacity of 250 tons per 10 hours. Only one will be described, as they are practically duplicates.

Car tipple and bins from which the "muck" is "gunned" to the washer

The "muck" and water go first to a chain drag conveyor, which is a new device to put at the head of a plant in these fields. This makes two products, an overflow containing sand (and a good deal of clay) and an underflow, dragged out by the conveyor, containing "lump rock," clay balls and "fine lump" and sand. It is understood that sand in this field is finely divided phosphate rock which it is desirable to save. In the Florida field the only sand accompanying the phosphate rock is silica sand, which it is extremely desirable to be rid of.



The 80-ft. thickener in which fine sands are recovered

The sandy underflow goes at once to the sand recovery department which will be described later on. The coarse overflow goes to 46x36-in. Traylor rolls, where it is broken to pieces about 2-in. in diameter. This break is partly to crush and flatten lumps of clay so that they may be more easily disintegrated, but it is more especially to bring the rock to a size that can be readily dealt with by the machines which follow.

From the rolls the product is elevated to two scrubbers, which are octagonal screens blanked off to send everything through. It next goes to a sand screen, 10 ft. by 48-in., with ⅛-in. perforations. The undersize goes to the sand recovery plant and the oversize goes to two 25-ft. McLanahan-Stone Machine Co. log washers. These log washers are to break up and to float off clay balls. From the log washers the material goes to a screen which has ¼-in. and ⅞-in. perforations. The oversize of the screen goes to a picking belt to be freed from limestone and flint. The undersize goes to sand recovery and the intermediate size, between ⅞-in. and ¼-in., is "fine lump," which goes to the dryer.

It will be noted that all overflows from

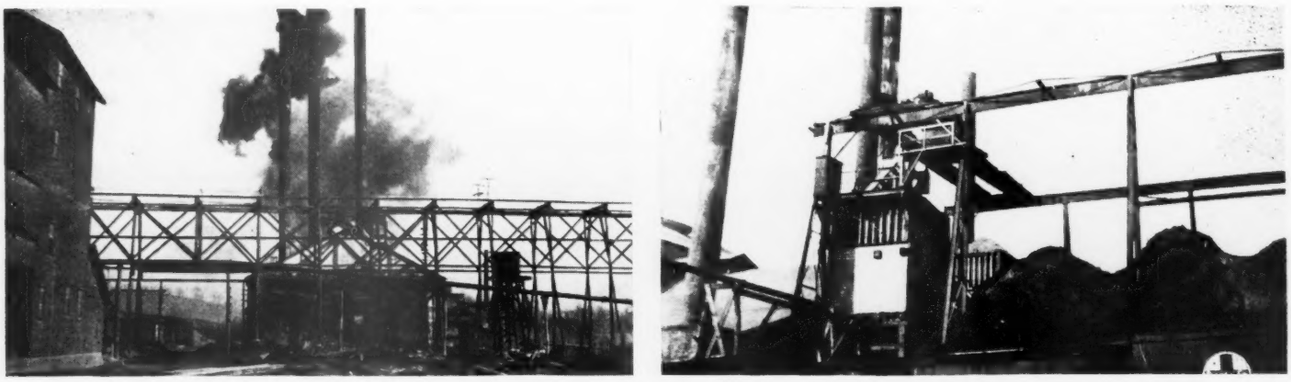
scrubbing and screening meet at the sand-recovery plant. This consists of cones arranged in sets of four, there being three such sets. Each cone is 14 ft. in diameter and has sides at 65 deg. with the horizontal. In the center of the first three cones is a hydraulic jet or injector (working on the same principle as a steam injector, except that it uses a jet of water instead of a jet of steam); and a pipe rises from this jet by which the sand is delivered to the next cone in the series. The last cone has no jet, as it is a dewaterer. Two of these dewaterers are Allen sand cones, the third being of the company's own design with a hand operated valve.

Each cone has an overflow and the overflows of all the cones go to an 80-ft. Dorr "hydro-separator." This machine is only a Dorr thickener fed so heavily that clay goes out in the overflow instead of settling with the sand. The underflow of this thickener is washed in three jet cones and a dewatering cone like those just described, and the overflow is sent back to the thickener.

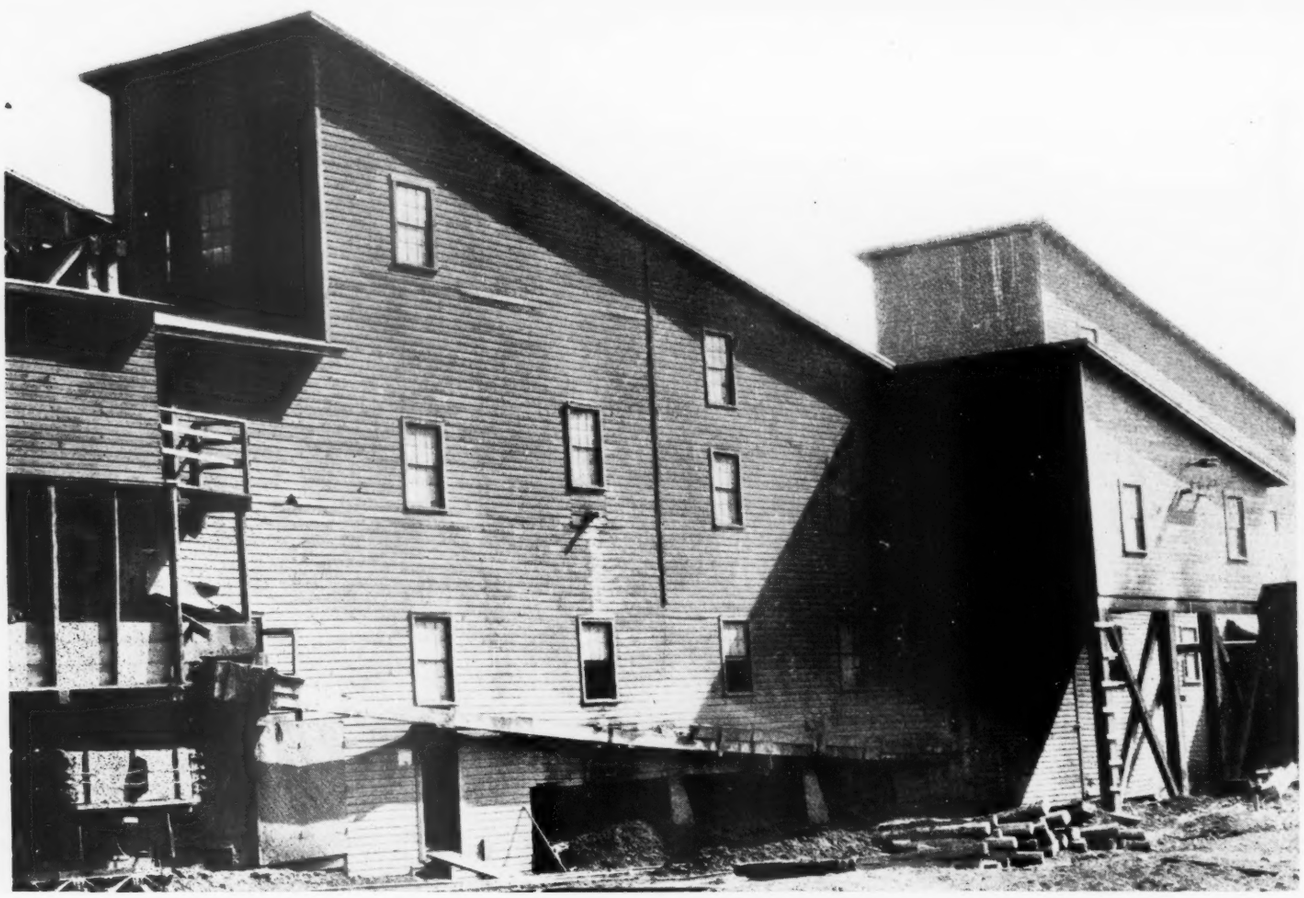
The thickener (or hydro-separator) overflow is therefore the only waste product. The solids it contains are clay and an extremely fine sand running 38 to 40% in B.P.L. and of no commercial value.

All the sand from the dewatering cones flows to the base of a stockpile, where it is dewatered and drained. It is picked up by a gantry crane and placed on the stock pile for air drying and further drainage before being sent to the rotary dryers.

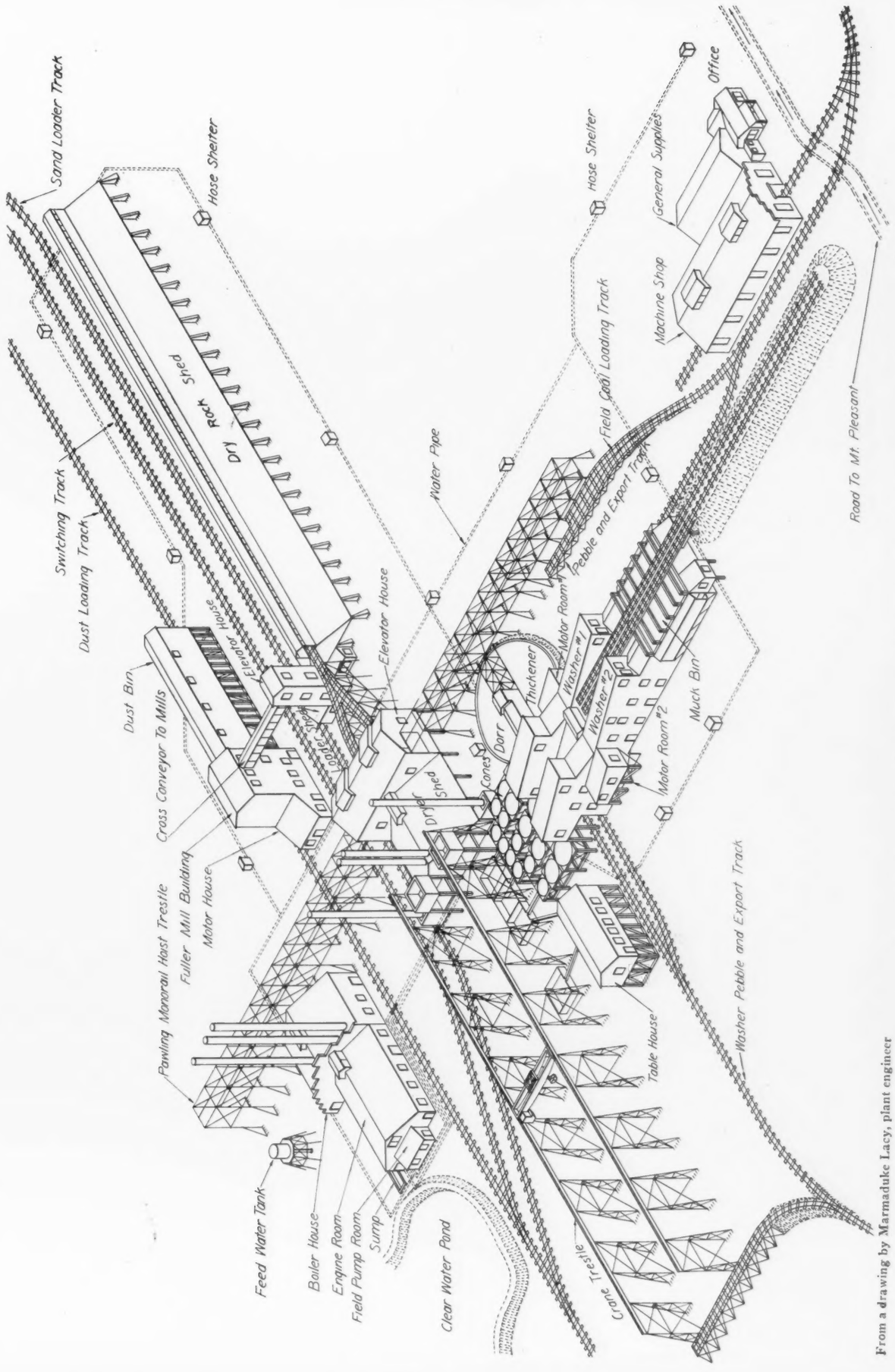
There are four of these rotary dryers, three made by the Allis-Chalmers Manu-



Left—System of handling coal to both boilers and dryers. Right—Traveling crane and wet sand storage



One of the twin washing plants which are of strictly straight-line design, requiring a building 200 ft. long but only 16 ft. wide



Isometric view of the washing plant and accompanying buildings

From a drawing by Marmaduke Lacy, plant engineer

facturing Co. and the fourth a Whiting dryer. From the dryer the material is elevated to a hopper from which it is drawn into a car handled by a small electric locomotive and taken to the long stock house which has a capacity of 10,000 tons storage.

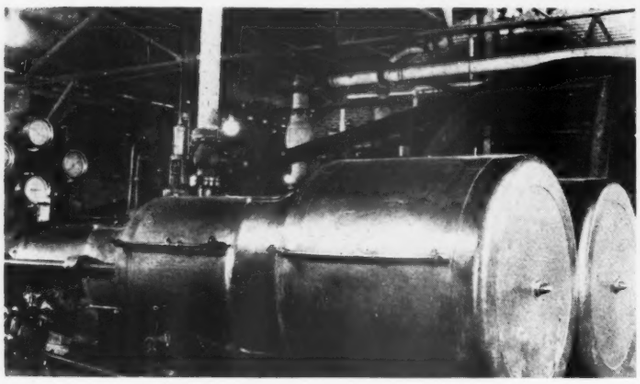
There is a concrete tunnel the full length of this stock house in which a 24-in. belt conveyor runs. This tunnel is wide enough for a man to walk beside the belt easily and is well lighted. Cast-iron spouts through the roof feed the dried phosphate rock (all phosphate rock sand) to the belt. A cross belt takes it either to cars or to the elevator of the grinding house. It is loaded into cars by the Manierre electric box car loader so much used in these fields.

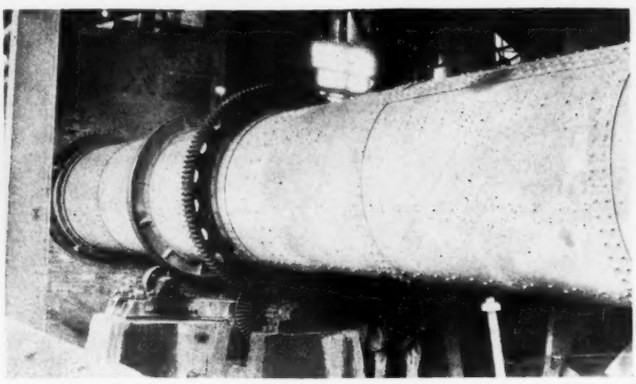
A part of the flow from the belt that runs in the stock house tunnel may be turned to the elevator that runs to the grinding house when this is desired. The elevator discharges on to a conveyor that carries it across the railroad track to the grinding house on the other side.

The grinding house has two Fuller-Lehigh mills, each of which has its own motor, one a General Electric, the other an Allis-Chalmers. Both motors are rated at 75 hp. Power is taken to the mills by a quarter turn belt over a Lenix drive.

Each of these mills grinds 50 tons a day. The very fine product, practically all through 100-mesh, is elevated in a dust-proof elevator to a long screw conveyor that runs over the bins of the stock house for ground rock. It is a curious fact that this screw conveyor has to be run without a cover. If it is covered the ground material "sweats" until enough moisture has accumulated to make the material cake on the screw flights, so that the conveyor has no capacity. The ground rock bins hold 1000 tons.

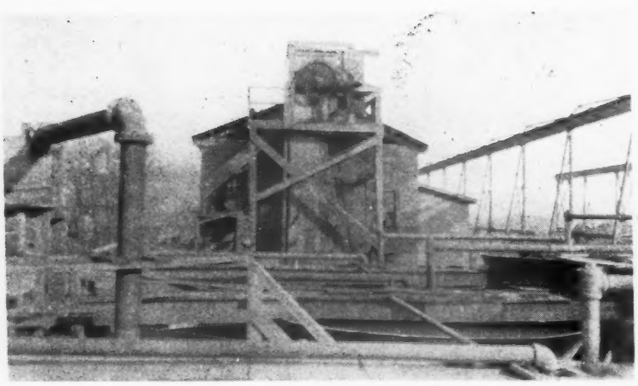
This ground rock is sold to some of the smaller plants which make acid phosphate and which find it cheaper to buy the ground product than to grind it themselves. The ground rock is shipped in

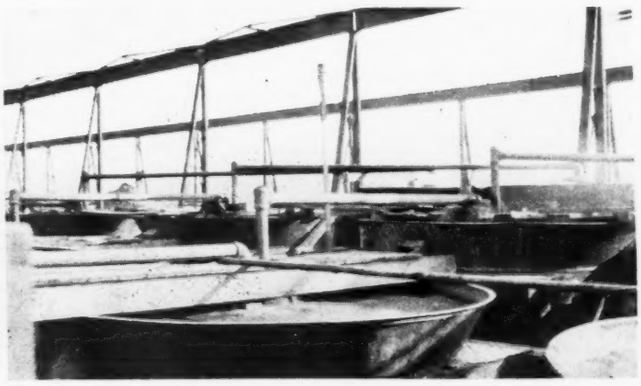




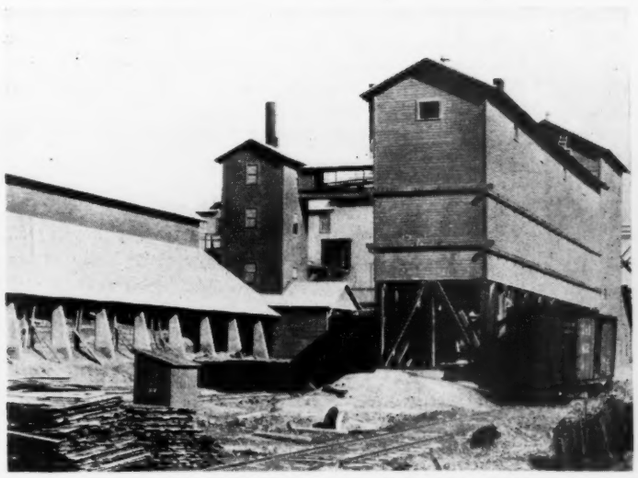
Left—Triple-compound pumps in power house. Right—One of the dryers

Left—Part of storage shed. Right—Machine shop





Left—The table house in which the sands are "concentrated." Right—Sand settling cones



Left—Fine grinding plant. Right—The tailings pond above the dam

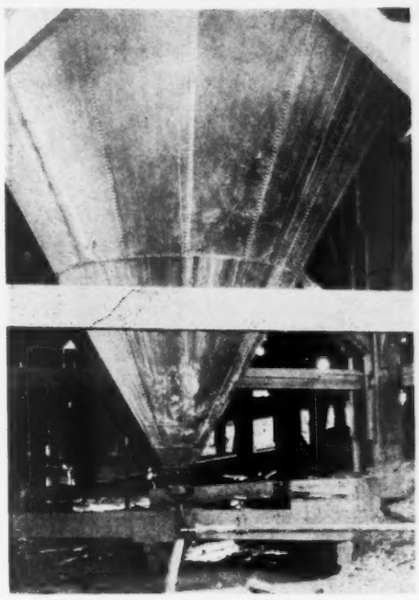
box cars which are lined with building paper so that the dust losses are practically nothing. The power required to grind a ton of rock is about 10 k.w.h.

The power plant is one of the largest in the Tennessee field. The main power unit is a 500 kw. turbo-generator. For pumping there are two triple-compound steam pumps, of the direct acting type—total capacity 4300 g.p.m. All these machines together with the boilers are either salvaged from the old plant or taken from other plants of the company, and yet the whole makes an efficient and well-balanced combination.

The unique feature of this plant is the use of Butchart concentrating tables to raise the grade of a portion of the product. These tables are the same as those used in copper and zinc and lead mines for concentrating ore. By passing the sand over these tables the grade is raised from 73% B.P.L. to 78%. This does not sound much put in percentages unless one is acquainted with the phosphate industry and knows that 78% B.P.L. is very high grade material and commands a premium for use in chemical manufacturing.

The tables, which are in a separate building, are fed from a "Cornish feed box," which is placed at the stockpile. The box is loaded by the crane and a small stream of water from a hose washes the sand out of the box and down a launder to the table house and to a circular distributor which gives every table the same feed.

As has been mentioned in several places before, a great deal of the machinery used has been salvaged from the old plant on this site and from other plants which have belonged to the Virginia-Carolina company. This has resulted in a very low cost plant, so low a cost in fact that three to four times as much money as has been spent would be needed to duplicate it. This is good engineering for it has kept the plant depreciation that has to be charged to every ton of rock that is produced at a low figure and has reduced the cost of production to that extent.



Water connection to "jet" cones

A word should be spoken of the coal handling system which is very well designed. A Pawling and Harnischfeger traveling crane takes the coal from the cars and deposits it either at the boiler house at the dryers or on a stockpile from which it can be reclaimed later by the same crane.

The gantry crane that handles the wet material into and out of the stock pile is a Norton-Shepard machine with a 1½-ton bucket.

The water supply and settling basins are remarkably large and well built. A dam has been thrown across the low land, through which the creek runs and this will impound about 600,000,000 gallons. This is for fresh water and it will insure an ample supply in the late summer when the creek is low. But a great part of the water used in the plant is recovered by settling out the solids. This is done by passing the flow through the settling ponds in series, the final overflow going back to the plant by gravity.

There is an excellent fire protection system with a special steam pump connected to water lines that are used solely for fire protection. These lines are tapped by hydrants placed so that every part of the plant is protected.

In so far as was possible from the limitations of the site the principle of "straight line production" has been adhered to in the design of the plant. The two washers are a noteworthy example. Each is housed in a building which is only 16 ft. wide although it is 200 ft. long. A by-product of this method of designing is that it gives plenty of light, the long narrow building permitting the use of plenty of windows.

The designer of the plant is P. H. Haskell, general manager of the company, who came to Mount Pleasant about three years ago. Mr. Haskell is a native of South Carolina, but was given a mining engineer's education in Goettingen and Hanover, Germany, after which he attended the Massachusetts Institute of Technology for special work and in order to familiarize himself with American practice. He had charge of mines for the Tennessee Coal and Iron Co. in Birmingham for several years and afterward was in charge of the pyrite mining operations of the Virginia-Carolina Chemical Corp. until the Frasch process made Louisiana and Texas sulphur so cheap that pyrite could no longer be mined profitably. Afterward he was made manager of the Charleston Mining and Manufacturing Co., which is a subsidiary of the Virginia-Carolina Chemical Co.

Marmaduke Lacy of Mount Pleasant was the engineer who made the drawings for the plant and who now is in direct charge of its operation. I. E. Newman is superintendent.

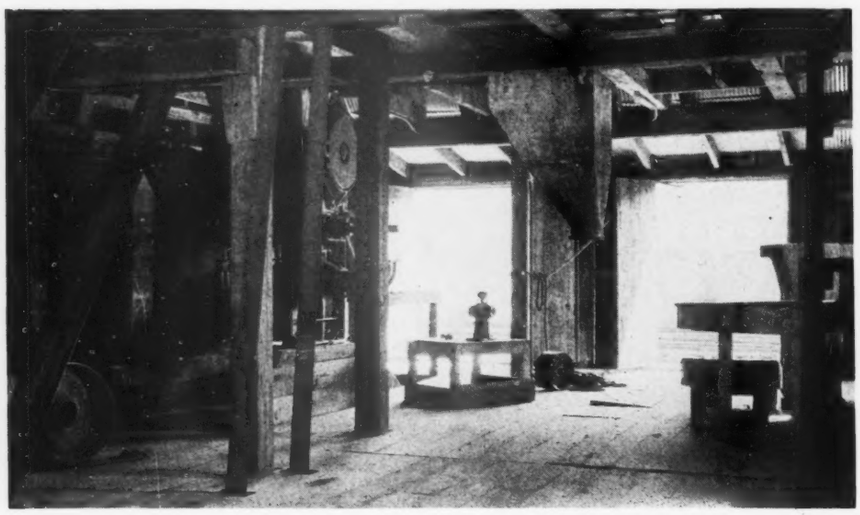
Hints and Helps for Superintendents

Loading Cars with Ground Limestone

A SYSTEM of loading cars with ground limestone which has interesting features is in use at the Stearns Lime Co., Danbury, Conn. The limestone may be loaded without weighing or measuring, or it may be measured before being loaded into the car.

When the lime is to be measured the "batcher" shown in one of the pictures is used. This dumps into a hopper through a hole in the floor below, which is shown closed in the picture. Below this hole is a small hopper which feeds into a screw conveyor. This conveyor discharges into another screw conveyor at right angles by which the ground limestone is carried into the car. This second conveyor is movable; that is, it can be slid back and forth on rollers so that it can be pushed out into the car or drawn back into the plant after the car is loaded.

The movable conveyor in this case is drawn by electric motor with gear reduction of speed. In another case where a movable conveyor of this kind was used, the drive was through a square shaft attached to the end of the conveyor shaft. This square shaft ran through a square hole in a special pulley which gave motion to the square shaft in all positions and thus turned the conveyor.



The "batcher" dumps through a hole in the floor which is shown closed in the picture

Keys and Keyways

By WALTER DOLL

Superintendent, Sheldon Slate Products Co.

MANY expensive machines are materially damaged through no other medium than the key, and I have arrived at the conclusion that its importance is not stressed enough upon repair men. Crushers, motors, engines, hoists, line shafting, pulleys, etc., are all subject to damage from badly fitting keys. In one instance the flywheel on a jaw crusher came off, due entirely to the fact that the two keys holding it in place were not properly fitted. The result was a badly scored main shaft and flywheel hub.

As a rule, when a machine leaves the factory, the keys fit as nearly perfect as it is possible to machine them. If nothing happened to the machine during operation, very little trouble would be experienced with keys. However, all machines need repairs at some time or other and it is usually then that trouble with the keys commences. A keydrift or key puller is used for taking out the key and no matter how much care is taken the key or keyway, and sometimes both are bruised. When reassembling, without first dressing, these bruised places make the key drive hard and give the false impression of a tight fit. The result is that in the operation of the machine the part keyed generally comes loose. It may stay together for some time (in which case the repair man is lucky), but it will eventually work loose, damaging the keyways. If not detected in time the damage is likely to be serious.

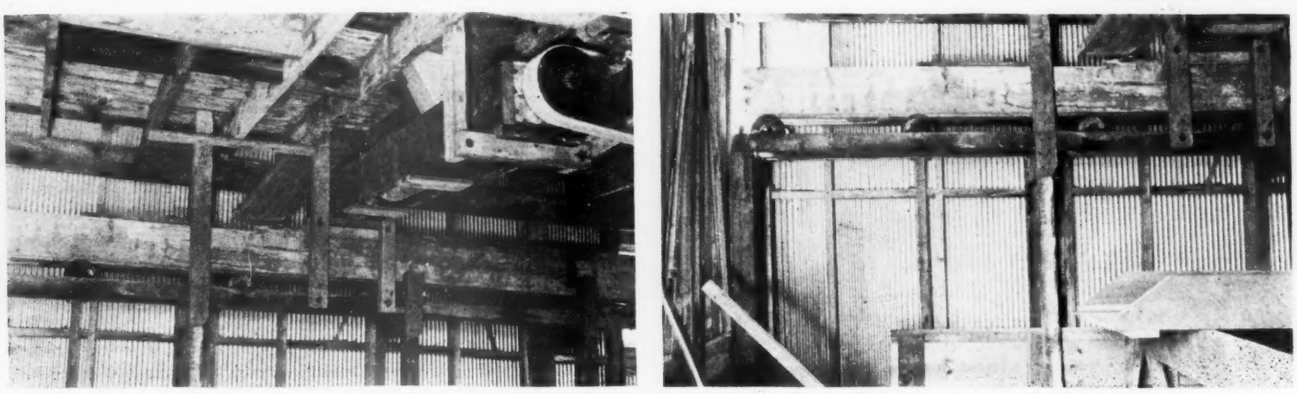
Without question, it is good practice to go over the keys and keyways thoroughly when reassembling a machine, and to spend whatever time is necessary to get a good fit in these parts.

Rules for Fitting Keys

The following are a few simple rules for fitting keys and, if followed carefully, will practically eliminate key trouble:

File the edges of keyways to remove the sharp fin left in machining.

Remove all burrs and high places from the keyway, especially after removing an old key.



Left—The short conveyor feeds into the movable conveyor on rollers against the wall. Right—Where the conveyor passes out of the building

Remove all burrs and high places from the key. Hard driving with a key drift will upset the end of the key.

Round all four edges of the key to assure the key fitting on the bottom and sides instead of the corners.

Fit the key to the keyway so that it will lie flat on the bottom with a snug sliding fit on the sides.

Round the nose of the key on all four sides. Use a comparatively large radius so that the key can be driven in without scoring and out without swelling in the keyway.

Be sure the shaft and hub of the part to be keyed have no high spots to prevent a proper fit between these parts.

If necessary to use a shim to take up play between these parts, have this shim surround the shaft, cutting out just enough to allow for the key. If this is not done the wheel will wobble badly and probably come off.

Use gib head keys wherever possible to facilitate easy withdrawal.

When a solid hub is to be keyed to a shaft the key should bear tightly against the top and bottom of the keyway having the sides a sliding fit as above. It should be a good drive fit.

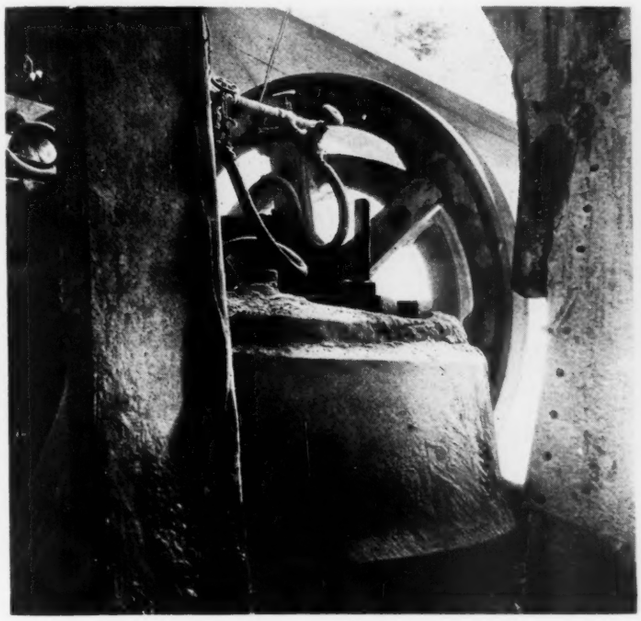
In the case of a split hub, bolted, the key should be a light drive fit between the top and bottom of the keyway. Otherwise it will spring the bolts and lift the top of the hub from the shaft, causing the wheel to work off the shaft very quickly. This fit must be accurate in order to give good results.

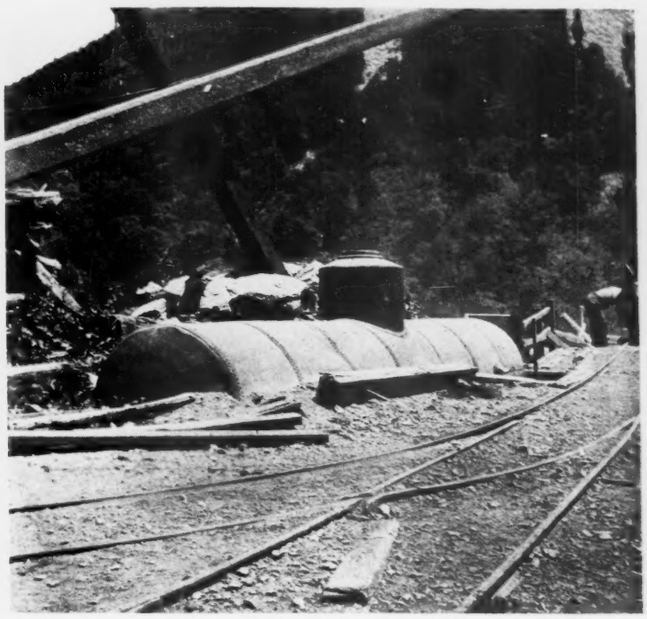
In fitting taper keys treat the sides as above. Keep trying the key in the keyway, filing down the high spots as it continues to go in. It should bear over the entire taper surface before it is quite home. A few good solid blows will then drive it home and complete a good job.

Cooling a Jaw Crusher with Water

A JAW crusher running at a high rate of speed and crushing hard rock gets very hot from the conversion of the work of crushing into heat. Sometimes this heat is enough to burn out the main bearings of the crusher, no matter how thoroughly they are lubricated with oil. When this is the case water has to be used to cool the machine.

One cut shows the water connections on a jaw crusher at the Water Street Trap Rock Co.'s plant at Water Street, Penn. Water is kept running through the bearings of the swinging jaw and main shaft and in this way the heat is absorbed and the bearings kept from burning out. There are three crushers in the plant and all three are water cooled and lubricated.





Left—The connections are made through pieces of hose on account of the vibration. Right—Water tank made of an old boiler sunk in the quarry floor above the crushers

The interesting fact about this installation is that it was designed and built at the plant, using ordinary materials such as may be found at any crushing operation.

Water is supplied by a small centrifugal pump which pumps from the river near by. The water is raised to a tank on the quarry floor and flows by gravity to the crushers. The water tank is an old boiler and this adds another to the numerous uses of discarded boilers which have appeared in these pages.

A recent advance in the use of water for both cooling and lubricating has been made by the use of rubber lined bearings. Rubber has been found superior to metal, as it does not cut out so easily. Of course wherever water is used as a lubricant, or in any other way where it flows over moving parts, care must be taken to filter it in order to insure that it is free from grit.

Foaming in Boilers Prevented by Castor Oil

SO FAR as the author has read, castor oil seems to be the only substance used as a foam preventive in steam boilers. Hobbs makes this statement and adds that the action is due to the ability of the oil to raise the surface tension of the water. An experiment with a Du Nouy apparatus in this laboratory showed, however, that water saturated with castor oil had a surface tension about 10% less than that of pure water. The flask experiments can be summarized as follows:

A mere trace of castor oil stopped almost instantly the foaming of all of the mixtures of soluble material the films of which had been stabilized with finely divided solids, regardless of whether the dissolved substance raised or lowered the surface tension of the liquid. This effect was so strong that if one drop of the oil was shaken with 100 cc. of water, a few drops of the water were sufficient to stop the foaming of 500 cc. of mixture.

A large number of experiments were made with fats and oils other than castor oil as foam preventives, and also on the effect of castor oil on foams such as those of solutions of soap and saponin which do not depend upon solid matter for their stability. The results were interesting in the extreme, but so far have eluded all attempts to correlate them so that a general theory can be formulated. It is needless to add that this work will be continued.

For the prevention of foaming of the sort caused by mixtures of dissolved substances and finely divided solid matter, castor oil is preeminent. No general theory of foam prevention can as yet be advanced.—*Industrial and Engineering Chemistry.*

An Unusual Quarry and Plant Operation

Hoffman Bros. & Wilson Find It Better to Sink Their Quarry Workings Than to Extend Horizontally

THE quarry and plant of Hoffman Bros. & Wilson, Harrisburg, Penn., are both unusual. The quarry is being worked by sinking one level after another instead of proceeding horizontally and the plant is of a unique design, resembling no other plant that has come to the writer's notice.

One reason for working the quarry in this way is that the ledges are folded and bent "all out of shape" so that there is no regular floor. A well defined syncline and anticline show in the face of the quarry and the strata are everywhere broken by the folding action.

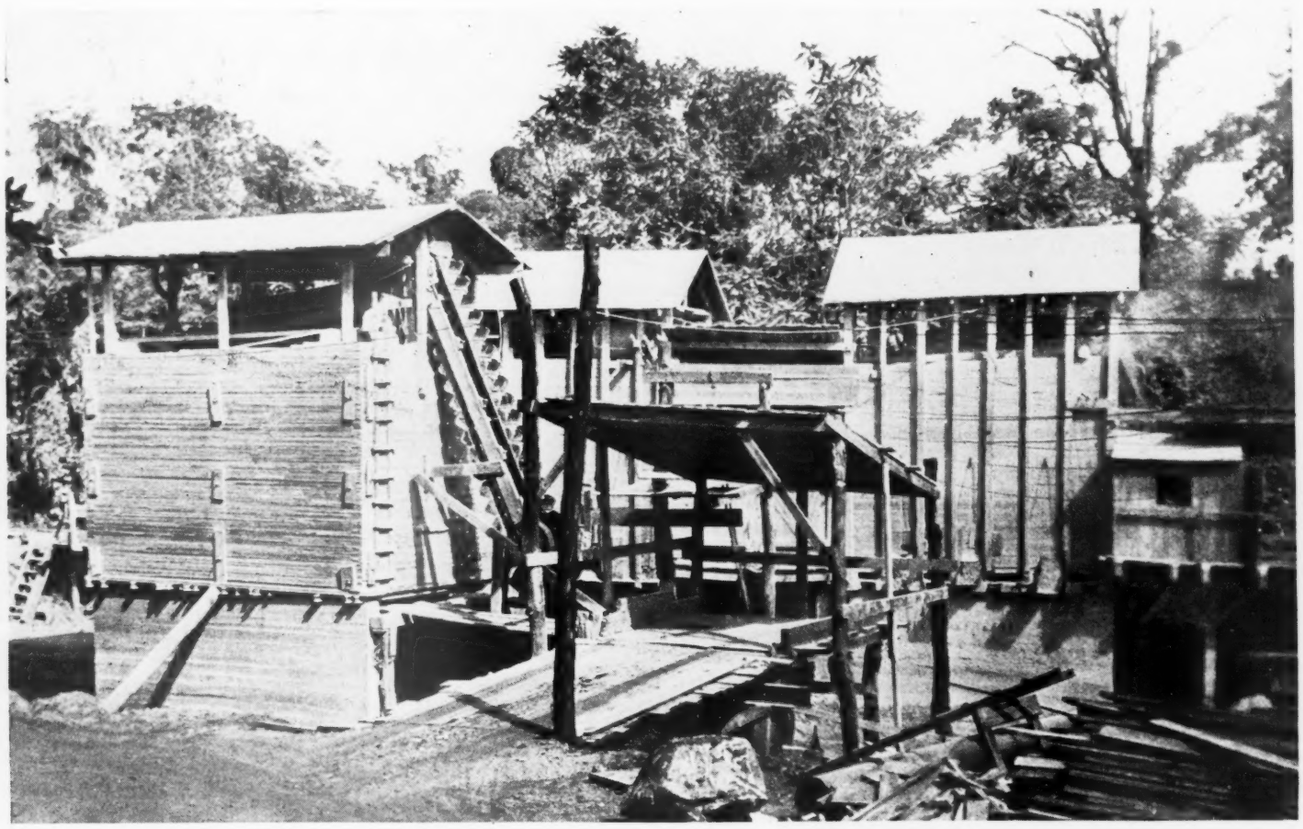
Originally the quarry was worked in the usual way (that is, the usual way in this country where there is no floor to work on), maintaining the face 60 ft. high. When the distance between the face and the plant had grown to where transportation was a problem, the question was whether to extend the workings horizontally and stripping the ground, or to go down. It was known that some water would have to be pumped if the quarry was deepened, but after carefully calculating it both ways it was judged, to use Mr. Wilson's words, "that it was cheaper to pump water than to shovel dirt." That is, pumping up to a certain amount was cheaper than stripping.

Another argument in favor of deepening the workings was that cleaner stone would be obtained than could be possibly obtained from the upper workings, even where these were carefully stripped.

So it was decided to deepen the quarry 30 ft. and after the area had been worked to the old quarry face to sink another 30 ft., unless the water encountered would cost too much to pump. The first 30 ft. sinking has now extended over about one-half of the area opened by the original working.

An Armstrong 6-in. well drill is used for putting down the holes in the regular way, the holes being usually set 15 ft. apart and 15 ft. from the face and carried 5 ft. below the floor level. They are loaded with 40% blasting gelatin. For block-holing 50% straight N. T. powder is used. Block holes are put in by an Ingersoll-Lyner drill and a Hardsocg Wonder. Both these are used for removing any "toes" that are left by the shot and generally cleaning up the quarry floor.

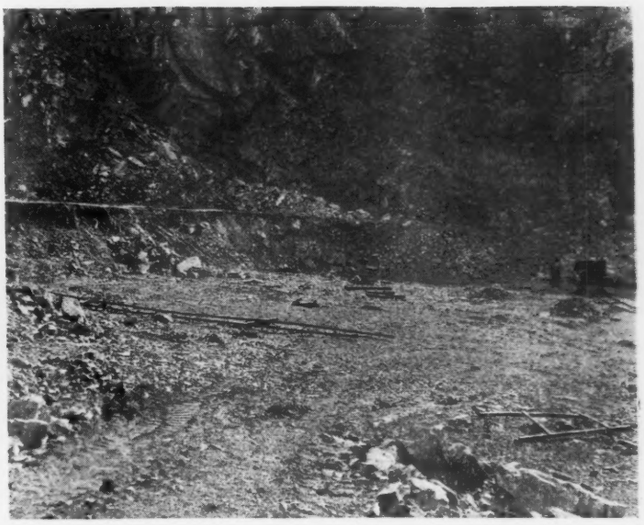
The quarry cars used were designed by the company and made at the plant. They are loaded by means of two Erie Type B steam shovels on crawler treads. All other machinery around the plant is driven by electricity, Westinghouse motors being used throughout.



The main crushing plant, which is really two plants placed end to end, is in the rear; the recrushing plant is in front at the left

The loaded cars are pushed by hand to the foot of the inclines that lead to the plant. There they are hooked on to a cable that is connected to an electric hoist. There are two of these hoists, one made by the Lidgerwood Co., the other by Orr & Sembower.

The car is pulled up the incline when the hoist man receives a signal from an electric bell, the push button being on a post at the bottom of the incline. The car goes to one of two primary crushers at the plant.



Left—Part of old quarry face taken from original floor. Right—Quarry face. Note folding in back at right

Left—Drill working on original quarry floor. Right—Steam shovel loading cars on lower floor

Left—Incline up which cars are drawn to left-hand crusher. Right—Incline up which cars are drawn to right-hand crusher. Signal bell push is on post at left

The fact that there are two primary crushers is one of the unique features of the plant design and another is that they are set at opposite ends of the plant so that to reach one of them the car has to pass it and be lowered down on a switch-back. It is probable that this peculiar design was determined by the ground. It will permit working of ground at the other end of the plant if this is desirable.

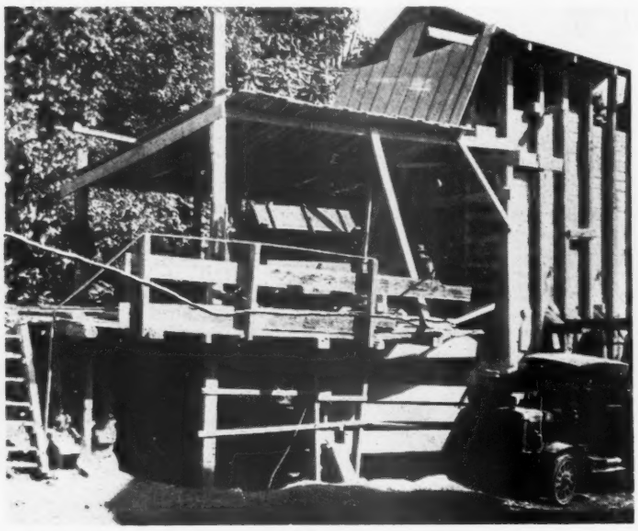
But as the completed plant now stands it is two plants set end to end with bins between. The two crushers are Reliance 15x30 in. jaw crushers. Gyratory primary crushers were tried, but they did not prove so satisfactory as the jaw crushers.

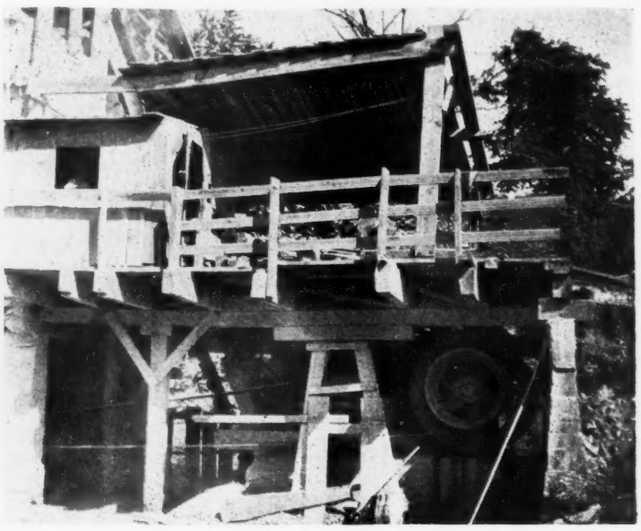
There are two screens 36 in. in diameter and 15 ft. long to which the crusher product is elevated. All commercial sizes are made by these screens. The dust is sold both for road dressing and for making concrete blocks, the latter being its principal use.

The oversize of the first screen, which is relatively small in amount, is either sold as a separate product or recrushed. The recrushing plant is situated near the primary crushing plant and the feed has to be transported to it by truck. This plant consists of a No. 6 Champion jaw crusher (12x26-in), an elevator and a revolving screen placed above a bin from which trucks may be loaded. This recrushing plant, of course, may be used to recrush any of the larger screen sizes as well as the oversize, and is often employed for this purpose.

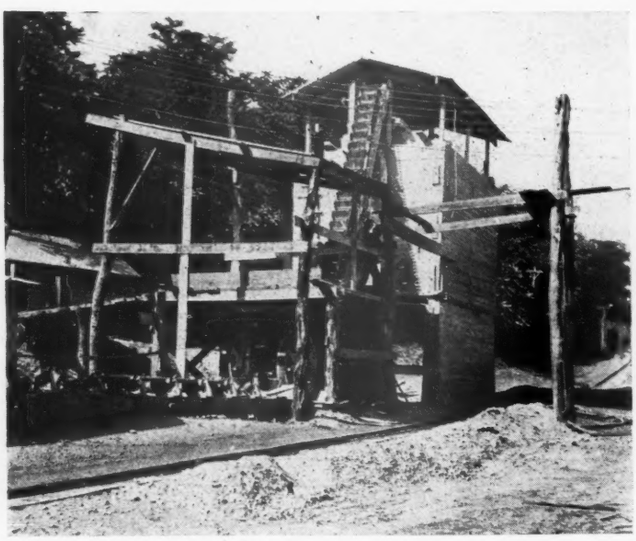
Since pumping is an essential part of this quarry operation, a good pump house and spare pumps and motors are provided. In this house are a 3-in. and a 4-in. Cameron centrifugal pump and another 4-in. pump which serves as a spare. All these are direct-connected to General Electric motors. Pumping is not continuous. The pump man waits until there is an accumulation of water in the sump and then turns on one or two of the pumps. The water varies with the season, but ordinarily the 3-in. and 4-in. pumps will empty the sump in 20 minutes.

Hoffman Bros. & Wilson is a partnership, the partners being G. E. and S. S. Hoffman and F. C. Wilson. The office is in Harrisburg. The company maintains a large fleet of trucks for the purpose of delivering stone in the city.





Left—The primary crusher at the left end of the plant; right—the primary crusher at the right end of the plant



Left—The recrushing plant to which oversize is brought from main plant by truck; right—pump house above quarry sump. It contains two 4-in. and one 3-in. centrifugal pumps

Folks and Fields Need Lime

A BOOKLET, called Folks and Fields Need Lime, has been issued by the International Harvester Co. It contains in the briefest and simplest form about all the argument that can be used for liming soils. Both "agstone" and burned lime are discussed and there are valuable explanations of simple soil tests, screen sizes and the like.

New Ideas at the Ladd Lime and Stone Plant

Unusual Quarry Practice—Washing Quarry Waste —Working Up "Screenings" to Valuable Products

THE Ladd Lime and Stone Co. operates the largest plant that supplies Atlanta and the thriving towns around the chief of Southeastern cities. This plant was described in detail in the August 13, 1921, issue of ROCK PRODUCTS. Since that date a number of improvements have been made which will be more particularly dealt with in this account.

Plant and quarry are near Cartersville, Ga., some 30 miles north of Atlanta. The station at the plant is called Ladds. The quarry face, which has cut through a hill and is 200 ft. high in the center, is a prominent feature of the landscape.

This quarry presents an interesting problem. The upper 50 ft. is a band of light yellow silicious limestone, which, before the days when portland cement could be so easily obtained, was quarried and burned to make hydraulic lime. This, while it was a true lime, had some of the characteristics of portland cement, including that of setting under water.

At present there is no call for hydraulic lime, and this siliceous limestone is broken into the commercial sizes of crushed stone.

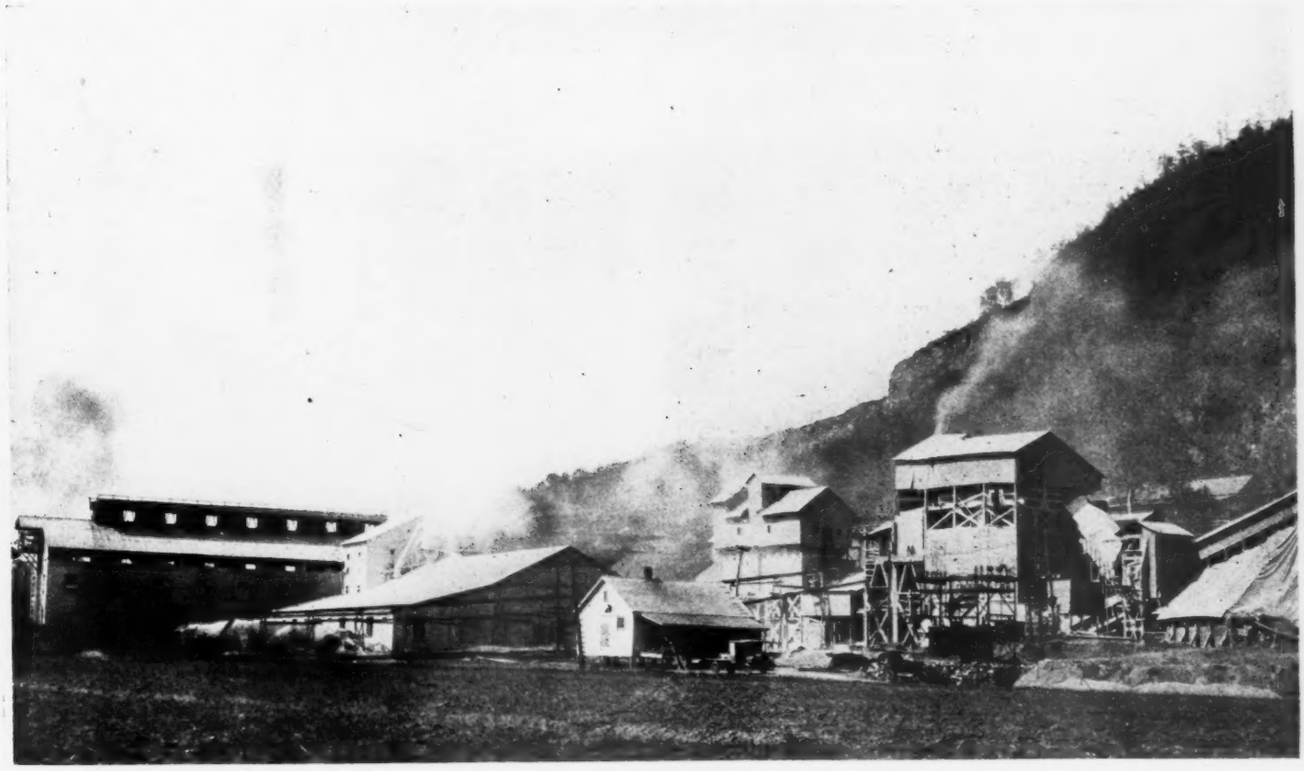
Below this band the entire face is of blue dolomite, very much resembling, both in physical and chemical properties, the dolomites from which lime is so much made in Ohio. And like the Ohio dolomite, this rock, when burned, produces a large proportion of finishing hydrate.

The problem in this quarry is to remove the 50 ft. of silicious stone as easily and cheaply as possible. Formerly this was worked as a separate bench. But it is hard to drill and to blast, and as it stands very well the present method, which is still somewhat experimental, is to undercut it and then shoot it only enough to cave it down.

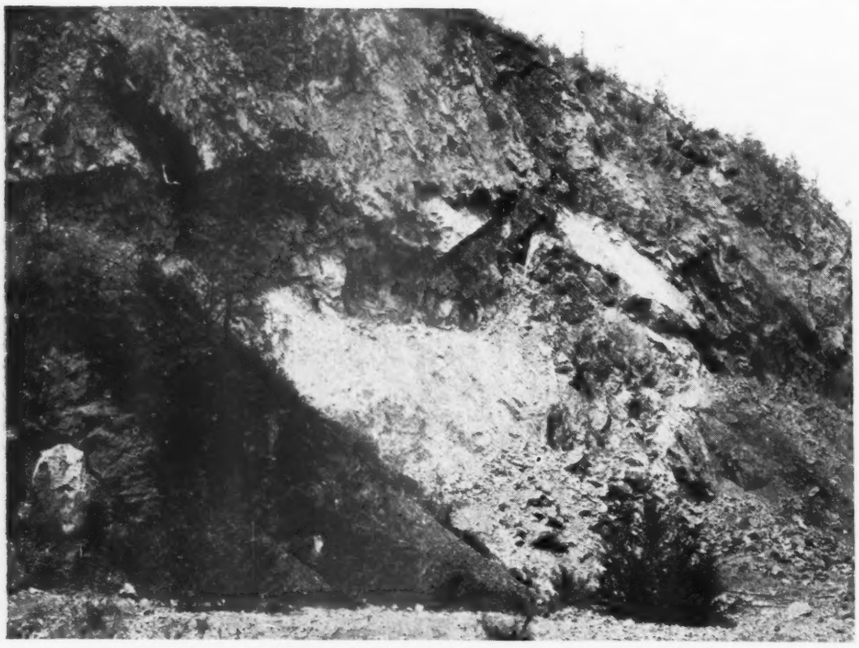
The dolomite below is worked in benches, Ingersoll-Rand tripod air drills being used. The broken rock is loaded into "home made" wooden cars by hand and these run by gravity either to the crushing plant or to the lime kiln, the quarry floor being given sufficient grade to accomplish this. The empty cars are returned by mules or by a Fordson tractor, which has been fitted with railroad car wheels. The Fordson was a recent acquisition at the time of the writer's visit and it was working so well that it was thought that ultimately the mules would be displaced by it.

The feed track from the quarry runs directly over the kilns so that the kilns are fed by dumping the cars into them. These kilns (and the remainder of the lime plant) were designed by Richard K. Meade, of Baltimore. They are lined with a double wall of fire brick which seems to provide an effective insulation, since one can bear his hand on the outside of the kiln at the burning zone. Coal is brought to the firing floor by an elevator at the end of the plant. The cooler below the kiln is water jacketed to take away the heat rapidly and the draw shears are of the mechanical type.

A certain amount of burned lime is sold as lump lime, although this quantity is much less than it used to be, and no attempt is made to stimulate the use of lump lime. But it is very well packed for sale in a special 90 lb. waterproof bag. As a test, one of these bags stood outside from December to March last winter, in which



From left to right the buildings are: kiln house, hydrating plant, crusher (with office in front) and fine grinding plant. The conveyor to the stone storage is at the extreme right



How one quarry problem has been solved. The hard silicious rock above the dolomite is undercut and then shot down in a mass

period there were a number of heavy rains. On opening the bag there was no sign to show that moisture had reached the contents. Mr. Backus, the manager of the plant, thinks these bags a great improvement over barrels as a package for lump lime, not only because they keep the contents in better shape but because one man can lift and handle such a bag in a way that he could not handle a barrel.

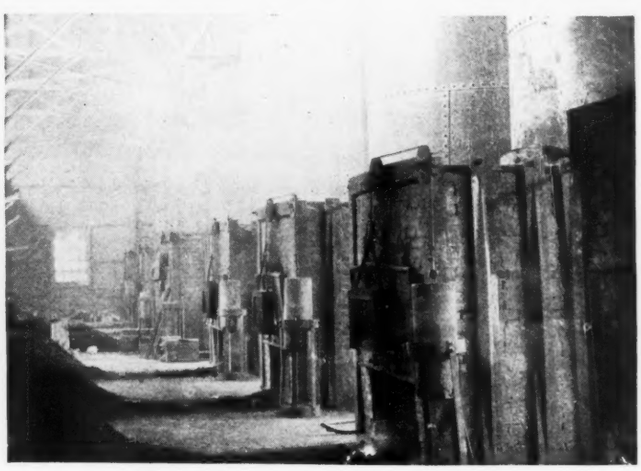
By far the greater part of the lime is made into hydrate. A pan conveyor which runs along by the lower part of the kilns takes this lime to a bin in the hydrating house from which it is weighed out to the hydrators. There are two Clyde hydrators in use, and as these are of the "batch" type, both lime and water are weighed for every charge. A covered sand filter is used for filtering the hydrating water.

The Raymond air separation system is used for separating the lime and the cleaned hydrate is packed in heavy sacks by Bates machines, and the sacks are sent directly to railway cars or to the store house, which is a comparatively recent addition to the plant.

The tailings of the Raymond air separation system are just now the subject of an interesting experiment. Analysis showed them to be 80% lime. A small Sturtevant rock emery mill was installed and some of these tailings were finely ground. It was found that this ground product much resembled *grappier* cement, which is a non-staining cement imported from France in considerable quantities, and it is possible that an important market may develop for this product.

The rock crushing plant, which is near the kiln, receives two kinds of feed. One kind is all the stone from the quarry, which is clean but which is not suitable for burning to lime; the other is quarry waste, which contains about 30% of clay and which has to be washed before it is sent to the crushing plant. The introduction of this washing plant is another improvement which has

The stone storage plant is empty because the market takes all the plant product as fast as it is produced



Tractor used in the quarry and view of the kiln room

turned a waste product into one of considerable value.

This washing process is interesting because it employs the log washer. It was natural that this machine should be adopted, as it is in such common use in the district for washing iron ore, barytes and ocher. In the Northern states the scrubbing is usually done in a big revolving cylinder, as at the Marble Cliffs Quarries near Columbus, Ohio.

This log washer handles 100 tons a day easily, and thoroughly washes out the clay. In fact, it does an unusually good job of it, for the clean stone discharged at the upper end does not carry enough clay to soil a handkerchief. All the clay balls, of which the feed contains a great many, are broken up and washed out before they reach the upper end. Mr. Backus thinks that the success of this method of washing is largely due to the mixed feed and the use of plenty of water. The picture shows that the log washer has a wider clearance between the blades and the trough than is usual in these machines. The log is of a type used in the iron ore fields, the central shaft or "log" being built up of steel bars. In the other plants in this district heavy timbers hewn to a hexagon section are used to support the blades.

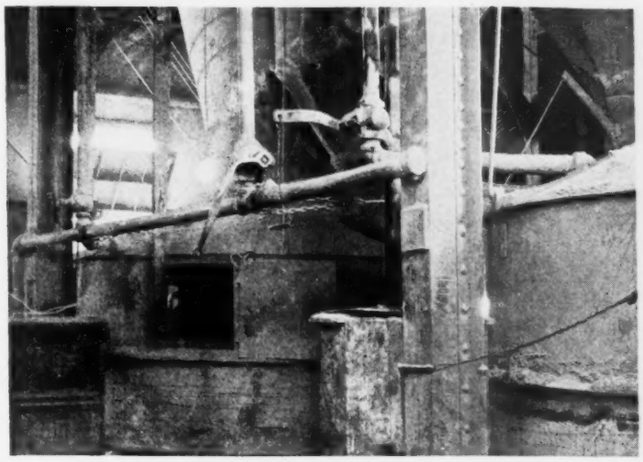
The primary crusher in the crushing plant is a No. 27 Kennedy-Van Saun and the two secondary crushers are a No. 5 Gates and a No. 7 Kennedy-Van Saun. Arrangements are made so that the primary crusher may be by-passed whenever the feed is light.

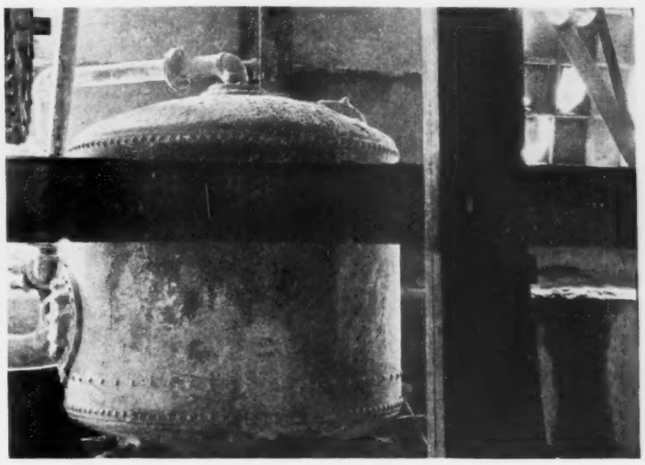
The crushed rock goes to two Kennedy-Van Saun revolving screens; these have 2-in., 1¼-in. and ⅝-in. round hole perforations and the dust jacket has ¼-in. perforations. The screened products go to bins from which they may be loaded into cars or sent to the storage plant. The oversize of the screen goes to the secondary crushers mentioned above and returns to the screen along with the product of the primary crusher.

The dust (minus ½-in.) from this plant is not sold as it comes from the screens. It is dried and then made into two valuable products, agricultural limestone and asphalt filler. The demand for the latter product is good in the market supplied by this plant and hence the greater part of the dust is made into filler.

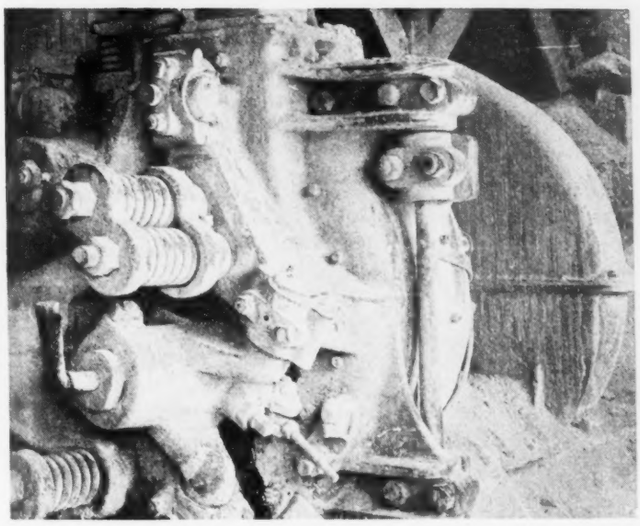
Drying the dust before grinding gives much better screening and it is essential for the air separation process that is part of the fine grinding. For drying a direct heat American Process Co.'s cylindrical dryer is used, a plain cylinder with lifters. The feed goes into the cold end. The dried product is conveyed to four Newago screens (Sturtevant), which have ½-in., ¼-in. and 10-mesh wire cloths in them. Everything that passes the 10-mesh screen is sent to the Raymond air separation system. Fifty per cent of this is already fine enough for asphalt filler; that is, 80% through 200-mesh.

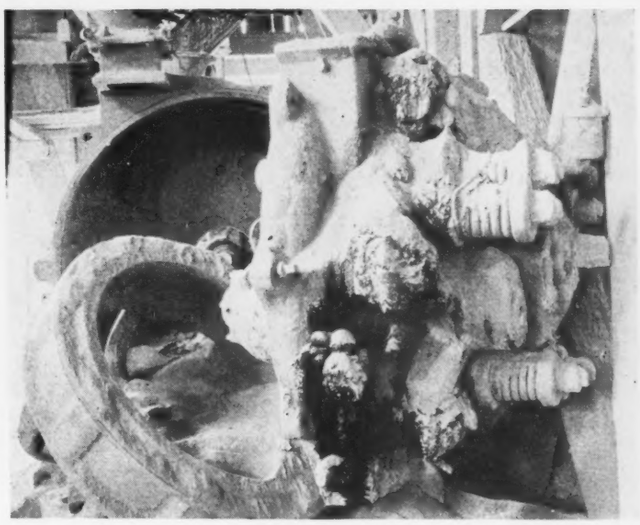
When agricultural lime is being made it is sufficient that the product should all pass a 10-mesh screen. By far the greater part of the product is, of course, much finer than 10-mesh, so it has found a ready sale as agricultural lime, especially to tobacco growers. The company has kept a record of tests made by different growers and some



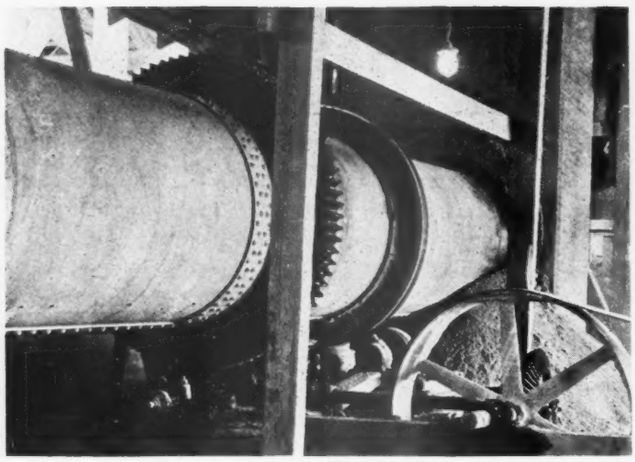


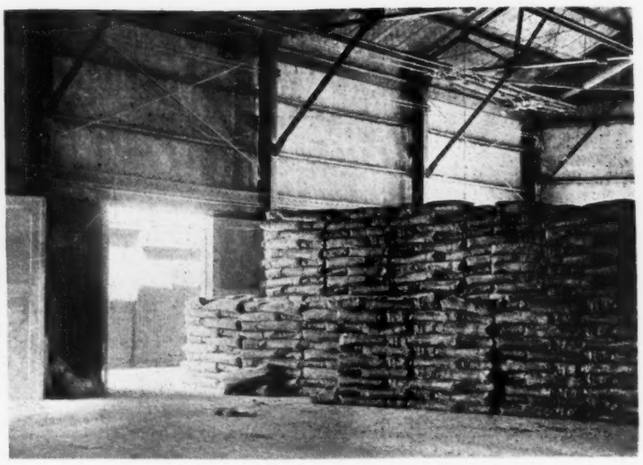
Left—The hydrators. Right—Closed sand filter trough which the hydrating water passes





The mill used for making asphalt filler shown closed and opened





Left—Dryer for screenings. Right—a corner of the hydrate storage house

of the results are astonishing. In one instance test plots were run with and without the use of this agricultural limestone, and the plots that had been treated with it showed an increase in the value of the crop amounting to $50 per acre.

It is worth noting that this agricultural limestone is made from a true dolomite; that is, 55% of calcium and 45% of magnesium carbonate. Before it could obtain a footing it had to meet and overcome the usual negative of propaganda that seems to be connected with the introduction of anything new in the way of rock products. Of course the propaganda was quickly refuted by the result of tests made by state and national agricultural bodies. As a matter of fact, the ground dolomite showed a little higher yields than the high calcium limestones which were tested with it.

To return to the asphalt filler into which most of the dust from the crushing plant is now ground. After the dried dust has passed the Newago screens the ½-in. and ¼-in. sizes are sent to bins as finished products. The oversize of the screen and the coarser particles which have been separated out by the Raymond air separation system go to a Sturtevant double ring roll mill. This mixture of sizes gives a better result in grinding than a finer feed would give. Parenthetically, it may be noted that the Raymond system is run without any pulverizer, such as is always used to break up lumps when hydrated lime is being separated. The material being dry and so much of it being coarsely granular, no pulverizing is needed.

Tests have shown that the mill will grind 33% of this mixed feed through 200-mesh in one pass. The material is kept in the return circuit until the air separation puts it out with 80% through 200-mesh. Of course this means that practically all of it will pass 100-mesh.

From the air separation system the filler goes to a bin which feeds the Bates sackers. It is sacked in heavy paper sacks marked with the company's name and trademark.

The Ladd Lime and Stone Co. has its main office in Cartersville, Ga. The entire operation is in charge of L. J. Backus, vice-president and general manager. E. A. Harden is plant and quarry superintendent.

The log washer and spray pipe

Bag for asphalt filler

Mr. Backus, in talking with Rock Products' representative, said that his idea of management is the prevention of waste—all kinds of waste. And certainly he has carried it out in this operation, as nothing gets away from the plant but a little clay that is washed from the quarry waste that was formerly discarded. Everything about the plant is in good shape. The kiln building and hydrating plant and warehouse are all built of steel and concrete so that the risk of fire is entirely obviated.

A crushed stone storage plant permits storage of different sizes for future marketing. The stone is brought from the finished product bins by an overhead belt conveyor and reclaimed by a conveyor below the bins.

Editorial Comment

The Answer to Foreign Cement Competition

The selling price of portland cement is made up of two principal elements—the price the producer receives and the price of transportation or distribution. As is the case with all other heavy, bulky, basic materials, the price of distribution is a very important part of the ultimate selling price. A portland cement manufacturer would have to use a lot of ingenuity, and very likely invest a lot of money, to save 10c a barrel in his production cost, yet a 10c difference in freight rates occurs frequently in unexplainable and sometimes apparently unjustifiable ways. It is generally the deciding factor in competition between domestic producers.

Foreign portland cement has been put down in American seaports at a selling price of 10c a bbl. or so less than the home-made product, not so much because production costs in Europe are materially less than in this country, but because of extraordinarily low ocean freight rates, and exceptionally favorable rates of exchange. The transportation cost, however, is probably the biggest and most permanent differential, and the hardest one to overcome economically, since the ships that bring cement come anyway to take back cargoes of lumber and other American products.

The obvious way to meet this competition on fair terms is to establish water front cement plants at American seaports. This has been done at Houston, Texas; Redwood City, Calif.; and another plant is about to be built at New Orleans, La. All these plants are using (or will use) oyster shells and mud for raw materials. With these advantages of low-cost raw materials, the elimination of preliminary grinding, and water-route distribution, no live American portland cement manufacturers are afraid of imported cement competition—judging by their acts and their willingness to invest.

Of course, this does not take care of cement competition at those ports where it is impossible or impracticable to build cement plants, and doubtless the problem at these ports will become more acute by the diversion to these ports of cement that will be excluded by local competition from Houston, San Francisco and New Orleans. Ultimately, it is to be hoped that the demand for portland cement in Europe will reach a par capita consumption comparable to that in this country. Due to the good-will cultivated between our portland cement manufacturers and those of Europe, our country has been visited and our Portland Cement Association's promotional work has been studied by most of the prominent portland cement manufacturers of the world—with the specific object in view of going home and doing likewise. When they do, Europe will have no surplus cement to export.

Promoting Sand and Gravel

The discussion of the executive committee of the National Sand and Gravel Association brought out that its members are in favor of more promotional and educational work. This appears to be not only a legitimate but a very necessary function of the national body of producers as it is perhaps the one thing that can help the industry as a whole. And there is a wide field in which the association can work. We have thought so much of highway work and heavy concrete construction in connection with sand and gravel that we have somewhat forgotten the numerous other uses to which these can be put. As an example of their relative importance, one large producer after a careful survey, found that only one-half of his sand production was used in concrete, the other half being sold for various uses, some of which he did not even know about until the survey was made. The market for some of the minor uses of sand may seem small, but usually such uses demand a specially prepared product for which a higher price can be obtained.

An Engineering Advance

Few—even among those whose business it is to keep track of such things—have realized the importance of scientifically designed concrete. It was only about three years ago that the writer was talking with a student at one of the large technical schools in the East who had just come from a lecture on reinforced concrete construction. The thing that seemed to have stuck in his mind was the "uncertainty" of concrete as compared with some other building materials. Professor Abrams' work had been published at the time but it was received with some hesitation, not to say doubt. Today all this has changed. Concrete mixtures are designed to resist 1000 lb., 2000 lb., 2500 lb. or 3000 lb. in compression and the engineer places them with the same confidence and sense of security with which he would place a steel girder. Government, railway, industrial and municipal engineers have become well acquainted with the design of concrete mixes and use the principles in their daily work. The coming of scientific concrete really marks an engineering advance somewhat the same, though perhaps in a lesser degree, as that which came when steel began to be used for structural purposes. And it is to be noted that this advance has not come about on account of any improvement in the quality of portland cement, which is just the same as it was three years ago. It has come from a study of aggregates, an appreciation of better aggregates and an understanding of the relation of the aggregates to the mixing water used.

Phoenix Portland Cement Company to Build Plant at New Orleans

Sediment from City Filtration Plant Is to Be Used as Raw Material—First Unit to Have 2500 Barrels Output

THE Phoenix Portland Cement Co., with plants at Nazareth, Penn., and Birmingham, Ala., will begin construction at once of a plant at New Orleans. The operation at this plant will employ a most unique raw material. In connection with this new plant, the following statement has been sent to ROCK PRODUCTS from the office of Lindley C. Morton, the president of the company:

"Since January 1 of this year our company has been making a careful study of New Orleans with the idea of establishing a plant there for the manufacture of portland cement and lime, and we have now completed our plans and will start work immediately on the construction of this plant, to be built on a tract of 15 acres of land acquired from the Board of Port Commissioners, on the Industrial canal at the turning basin, and adjoining the plant of the Lukens Steel Co.

First Unit of 2500 Barrels Capacity

"The first unit to be constructed will have a daily capacity of 2500 bbl., or 10,000 bags of portland cement and 1000 bbl. of lime, but the plant will be so laid out that we can double this capacity as rapidly as market conditions warrant it. The initial investment of this first unit will be approximately $2,000,000. The plant will represent the last word in cement mill design and construction. Owing to the nature of the raw materials, the wet process will be used. The plant will be entirely fireproof, as all buildings will be built of reinforced concrete and steel. The operation will be absolutely dustless, and everything possible will be done on our part to make it a creditable addition to the industries of New Orleans. The construction will be done by our own organization under the supervision of R. J. Hawn, our chief engineer, and everything will be done to push the work as rapidly as possible, as we plan to have the plant in operation by September 1, 1925.

Unique Raw Material

"The unique part of this new operation will be the character of the raw materials that we will use. One of our raw materials is the filtration sediment, filtered from the Mississippi river waters by the city filtration plant of the Sewerage and Water Board. This material contains from 35% to 40% of calcium carbonate and the balance is silica, iron and alumina. The ratio of silica to iron and alumina is 2.0 to 1, which is ideal for the manufacture of portland cement. An examination of their records, for many years past, shows the material to be very uniform in chemical analysis. It is very finely divided and all passes the 200-mesh sieve."

"The New Orleans Sewerage and Water Board has approximately 200,000 tons of this material on hand at the present time, and in the operation of their plant they currently produce more than our total requirements will be. We have made a long-time contract with them for the exclusive right to take this material. In the past, the disposition of it has been an expensive problem, so they were very glad to get rid of it at any price. As New Orleans grows, the mount of this material they make will increase and, in turn, we will need more of it, as we will expand our plant to take care of the increased growth of the city.

To Make Up Lime from Oyster Shells

"The balance of our lime content will be obtained from oyster and clam shells, which constitute our other raw material. These shells occur in large reefs in the water bottoms adjacent to New Orleans, and our surveys have proven them to be practically inexhaustible. We have contracted with the state of Louisiana for the exclusive right to take these shells. The shells are practically pure calcium carbonate, and, together with the clay substance described, constitute the most remarkable raw materials that we have ever tested for the manufacture of a very high quality of portland cement.

"We will also install a rotary kiln lime plant for the manufacture of chemical lime and hydrated lime from the shells, as there is a large demand for both of these products in the territory to be served by this plant.

"Most of the output will be marketed in Louisiana, but as the plant will be situated on the Industrial canal, with excellent deep water facilities, we will also make shipments by water to the gulf ports and some export shipments as well. With the completion of this plant, the three plants operated by our company will have a combined output of 10,000 bbl. of Phoenix portland cement daily.

International Cement Corporation's Earnings for Nine Months

THE International Cement Corporation reports for the quarter ended September 30, 1924, net income of $921,426 after depreciation, federal taxes, etc., equivalent after preferred dividend to $2.37 a share on the 364,167 shares of no par common stock outstanding, as compared with $678,290 or $1.69 a share in the preceding quarter, and $755,623 or $2 a share in the corresponding quarter a year ago.

For the nine months ended September 30, net income amounted to $2,041,729 or $5.24 a share on the common stock, as compared with $1,852,542 or $4.87 a share in the like period of 1923.

The income account for the quarter ended September 30, compares as follows:

	Sept. 30, '24	June 30, '24	Sept. 30, '23
Gross sales	$4,955,033	$4,487,314	$4,001.542
Discounts, etc.	912,884	814.155	724,776
Net sales	$4,042,149	$3,673,159	$3,276,766
Mfg. cost	1,989,291	1,879,623	1,583,650
Depreciation	298,977	265,058	275.396
Mfg. profit	$1,753,881	$1,528,478	$1,417,720
Selling & admins. exps., etc.	626,175	602,777	532,428
Net opr. profit	$1,127,706	$ 925,701	$ 885,292
Misc. income	33,238	21,079	3,940
Interest			*4,479
Gross income	$1,160,944	$ 946,780	$ 893,711
Res. for Fed. taxes & cont.	239,518	268,490	138,088
Net income	$ 921,426	$ 678,290	$ 755,623

*Credit.

The income account for the nine months ended September 30, compares as follows:

Gross sales	$12,403,944	$10,463,324
Discounts, etc.	2,256,679	1,915,805
Net sales	$10,147,265	$ 8,547,519
Mfg. costs	5,071,367	4,224,051
Depreciation	746,538	699,699
Mfg. profit	$ 4,329,360	$ 3,623,769
Selling & adm. exp., etc.	1,733,030	1,454,878
Net opr. profit	$ 2,596,330	$ 2,168,891
Misc. income	57,274	20,528
Gross income	$ 2,653,604	$ 2,189,419
Int. charges, etc.		16,215
Res. for Fed. taxes & cont.	.611,875	320,662
Net income	$ 2,041,729	$ 1,852,542

New Tulsa, Okla., Cement Company Selects Its Name

A CHECK for $2.80 was mailed the other morning by the Mid-Continent Portland Cement Co. of Tulsa, Okla., to each of the nine persons who suggested that name as being the most appropriate for the new cement company located here.

The company had offered a prize of $25 for the name that would be decided upon by a committee of judges consisting of J. Burr Gibbons, president of the Chamber of Commerce; H. F. Newblock, Tulsa mayor, and Cyrus S. Avery, state highway commissioner. The decision was reached Friday night after the judges had considered over 500 names sent in by about 400 persons. It was thereafter decided to give each one of the nine successful contestants his share of the prize money.—*Tulsa (Okla.) World.*

Albert C. Steece to Manage Linwood Cement Company's New Plant

EXCAVATION work has been opened at the site of the new plant to be built by the Linwood Cement Co., near Davenport, Iowa, and Albert C. Steece, having over 20 years' experience in the production of Portland cement, has been named as manager of manufacture and sales.

With the report of these activities and the announcement that the contract for the erection of the new plant will be awarded soon, there is indication that the work will be pushed rapidly now.

Mr. Steece was formerly connected with the Ironton Portland Cement Co., at Ironton, O., as manager and later as president, John F. Schroeder, secretary of the Linwood Co., states. The Ironton concern in 1920 was merged with the La Salle Portland Cement Co., which purchased the German American Portland Cement Co., of La Salle, Ill. Mr. Steece remained as vice president of this company until both properties were bought by the Alpha Portland Cement Co.

He became interested in the Linwood Cement Co. in January of this year when he inspected the property here. He visited here again in June and has been in Davenport for the last 10 days on a third trip. Mr Steece hopes to assist in the development of the Linwood concern in which he sees much promise.—*Davenport (Iowa) Times.*

Port Huron Cement Plant to Increase Storage Capacity

STORAGE facilities for 300,000 bbl. of cement at the plant of the New Egyptian Portland Cement Co. will cost $220,000 and increase loading capacity of the Port Huron, Mich., plant from 20 cars a day to 60 cars.

Announcement was made by C. C. Peck, director of the company, that the first four of 16 storage silos, capacity 80,000 bbl., and the packing plant will be constructed at once. The additional 12 silos and connecting walls will be erected as needed. Preparations for foundations to bear the great load are being made by the McDonald Engineering Co., Chicago, to whom the contract was let.

The plant will consist of a series of concrete structures, similar to the farm silo, each measuring 32 ft. in diameter inside and 80 ft. high, and all connected by curving walls, which resemble on the outside the silos which they connect. These retaining walls will also be used to store finished cement. At the south end of a double row of silos will be situated the three-story steel and concrete packing house, with a 40-car-a-day capacity.

Belt conveyors and bucket elevators will carry the cement from the finishing mills through a tunnel to the silos and up to a distributing monitor at the top, where it will be dumped into storage. As needed, it will be drawn out at the bottom, and by similar conveyors will be taken to the packing plant. It will be possible with the 300,000 bbl. storage capacity to add 40 cars to the present daily shipping capacity of 20 cars, in addition to local deliveries by truck.

The Men Identified with the South Dakota State Cement Plant

THE South Dakota state cement plant at Rapid City, now completed, comprises nine buildings varying in size from a small pump house, 24x18 ft., to the main mill building, longer than a city block. The plant is patterned after a plant at Petoskey, Mich., which has a capacity of 2000 bbl. of cement a day.

A. C. Hunt, secretary and general manager of the plant, became a resident of Rapid City in 1907. He is interested in many business ventures, being secretary and manager of the Northwestern Quarry Co. and of the Paving Granite Co., both having headquarters at Rapid City. He is also actively interested in the Rapid City, Black Hills and Western railroad, the Black Hills wholesale grocery, the Rapid City Gas Heating Co., the Black Hills Building and Loan Association and is director and treasurer of the Rapid City Commercial Club. William Fownden, superintendent of the plant, started his connection with the cement manufacturing industry at the Alpha portland cement plant, near Philadelphia, where he was assistant to his father, who was superintendent of the plant. Later Mr. Fownden was for six years superintendent of the United States portland cement plant at Concrete, Colo. He spent a year and a half at Ragland, Ala., as superintendent of the National Portland Cement Co., and five years in charge of the Dewey Portland Cement Co.'s plant at Dewey, Okla. As construction engineer he supervised the building of the Hermit Portland Cement Co.'s plant at Nashville, Tenn. He is a member of the American Society of Mechanical Engineers.

William A. Ernest, chief chemist, has been identified with the cement industry for 20 years. In 1910 he became chief chemist for what is now the National Portland Cement Co. of Ragland, Ala. During the war he was assistant superintendent of the carbide materials department, Nitrate Plant No. 2, Muscle Shoals, Ala. He was later placed in charge of the general chemical department, which position he held until the plant was closed down. After the war he became chief chemist for the Gulf States Portland Cement Co. of Demopolis, Ala.

E. H. Backemeyer, sales manager of the state owned plant, has been for 10 years identified with the cement industry in South Dakota, northwestern Iowa and Minnesota. —*The Improvement Bulletin (Minneapolis, Minn.)*

Local Manager Says Metaline Falls, Wash., Cement Plant Is to Start Soon

IF the public feels as good as I do about the election of Coolidge and Hartley, it will help a lot," commented W. G. Perrow, local manager of the Lehigh Portland Cement Co., with offices in the Old National Bank building, recently.

"The republican victory now insures the starting up of the big cement plant at Metaline Falls about December 15 that will give additional employment to between 75 and 100 men. Our company had been sitting on the anxious seat for some months. Now I will be able to make a much more optimistic report to the cement manufacturers' association annual convention in Chicago than I would have if any other candidate had been elected.

"There is no question but what the election has served to re-establish public confidence and will release much work that has been pending for a long while. This work was not altogether delayed awaiting the outcome of the election, but uncertainty has served, during the last six months, to hold back development of several projects.—*Spokane (Wash.) Chronicle.*

Atlas Installs a Second Kiln for Making "Lumnite" Cement

ACCORDING to local Pennsylvania papers, the Atlas Aluminate Cement Co. has installed a second kiln for manufacturing the quick hardening cement which this company has developed and sells under the trade name of "Lumnite." The plant is at Northampton, Penn.

ROCK PRODUCTS published the announcement of the company's acquirement of the Spackman patents and the beginning of the manufacture of this cement in its issue of May 17. The cement has all the qualities which have been ascribed to the European cements that were first brought into public notice by their use for gun emplacements in the war. It attains a strength in 24 hours somewhat greater than that of portland cement in 28 days.

Colorado Cement Company Rewards Long Time Service

AS a reward for faithful service for 20 years with the Colorado Portland Cement Co., W. A. Wild, chief clerk at the Portland, Colo., plant, was presented with a check for $1,000 by General Manager R. J. Morse. This plan was inaugurated by the company several years ago and since that time a number of its faithful employes have participated in the custom. Between now and January 1 a number of checks of similar amount will be issued to employes who have rounded out 20 years of service.—*Pueblo (Colo.) Chieftain.*

To Build Large Dry Screening Sand and Gravel Plant in New York State

THE Sterrett sand and gravel interests of Springville, N. Y., have taken over the entire properties of Leonard Claire of Alfred, N. Y. This property is located on the Erie Railroad at Alfred station and includes nearly 160 acres of the best quality of sand and gravel. The bank is nearly 300 ft. high and has been worked by Mr. Claire for the past 18 years and it is one of the few banks in the state that has been accepted by the New York state highway department for road work without washing. The Sterrett Co. intends to erect a large screening plant capable of turning out 50 cars per day. This production coupled with the output of their Springville plant of 15 cars will place them among the largest producers of sand and gravel in the state of New York. Offices have been opened at 42 Broadway, Hornell, N. Y., to take care of the new territory.

Local papers say that Frank W. Sterrett of Niagara Falls and William G. Schweiger of Buffalo are the men who will control the operation. The papers also report that the new plant will cost between $75,000 and $100,000.

Still Another Use for Sand

A LETTER to the editor of *Engineering News-Record* proposes a use for sand we have not seen mentioned before in the literature of the industry. This letter follows:

Sand for Removing Snow

Sir—Noting in your issue of Oct. 2, p. 550, the article on "Snow Removal on Fall River Road Across Continental Divide," I am reminded that many years ago I spent a winter under the Arctic Circle in Europe and in the spring observed the peasants sprinkling sand on the snow which was of a minimum depth of 7 or 8 ft. In a surprisingly short time the snow was gone over the areas so sprinkled and the little fields were being worked in neatly-formed excavations with 3 or 4 ft. of snow all about.

What happened, of course, was that even in freezing weather the sun's rays raised the temperature of the particles of sand above the freezing point and the adjacent snow was melted and on cloudy days, when the air temperature was above freezing, heat was absorbed from the air and the melting of the snow was greatly accelerated.

Under a Colorado sun in May and June this process should show excellent results. It would seem that the sand should be clean, sharp and coarse; that it should be sprinkled as early as thawing begins under the direct rays of the sun, and probably over a 60-ft. strip to insure all possible sunlight even at the bottom of the trench, for trench there soon would be. After a fresh fall of snow fresh sand would of course be sprinkled. That this process will remove all the snow from the road long in advance of the time when it would otherwise melt, there can be little question. Whether the fresh snowfalls, lack of sunlight and low temperatures would so retard the action as to make it impracticable for the purpose cannot be judged from the information given in the article. As the cost would be trifling and no loss or delay possible it would seem to me that the materials for an interesting experiment are at hand.

ARTHUR O'BRIEN,
Consulting Engineer.

Utica, New York, October 6.

The letter mentions the use as a "possibility" but sand is used in this way to remove ice from the platforms of the Chicago "L" railway and has been for some time.

Illinois Concrete Highways

ILLINOIS has been the leader in concrete road construction for the last three years. This year it has built more than a sixth of all of the concrete highways constructed in the nation; last year it built more than a fifth of the nation's total, and in 1922 it laid considerably more than an eighth.

Last year the yardage in Illinois was 11,005,959, and the year before 6,603,025. For the United States as a whole the figures for three years are 57,444,970 in 1924, 54,888,224 in 1923, and 46,994,118 in 1922.

Illinois' position in road construction is shown in the following tabulation.

State	1924 Sq. yd.	1923 Sq. yd.
Illinois	10,617,073	11,005,959
Indiana	4,053,596	2,800,724
Michigan	5,609,370	3,365,633
Iowa	1,028,310	1,008,528
Wisconsin	549,978	4.567,117
Pennsylvania	5,814,514	3,853,018
New York	5,309,568	4,191,067
Ohio	2,255,829	2,586,706
California	1,563,929	1,737,107

What the mileage will be next year in Illinois, as the $100,000,000 bond issue has passed, remains for the state administration to say.—*Chicago Tribune.*

Plans of Indiana Highway Commission

THE Indiana State Highway Commission has outlined a program for 1925 with a definite decision to build next year a total of 226.6 miles of hard-surfaced roads, according to John D. Williams, director of the commission. In addition, the commission has agreed on a tentative schedule for the paving of 77.2 miles more, if the revenue is sufficient. Most of the roads will be of concrete.

If the commission can carry out its tentative as well as its definite program it will mean the construction of 303.8 miles of paved roads. The definite schedule is about the same as programs of previous years. The highway commission will govern its program largely by revenue, a large part of which is provided by the tax on gasoline. It is probable that a bill will be introduced in the state legislature for the repeal of the law which places a two-cent tax on gasoline for road building purposes, but the general belief is that such a bill would be defeated.

Oxford Sand and Gravel Company Buys New Deposits

THE Oxford (Mich.) Sand & Gravel Company, said to be one of the largest concerns of its kind in the world, have taken options on a number of farms in the region of Otter Lake and will close its options and make their plans for developing the deposits.

This company has had several men drilling in the North Lake region for about a week, and speculation ran wild as to what they were after. Some said it was oil; others marl, and visions of a horizon dotted with oil derricks or a great cement plant floated in the air. But what they were after was gravel, and they found it, to a great depth and of an excellent quality.

A gravel find is not so rich or romantic as an oil gusher, or of such enduring life perhaps as a cement plant, but at that it is not to be sneezed at. For it is said that the company will employ upwards of 50 men in the construction of a spur track to tap the property, in buildings to house the equipment and in the actual mining of the dirt. —*Lapeer (Mich.) Chronicle.*

Missouri Highway Contracts Total $6,500,000

DETAILS have been made available at the office of B. H. Piepmeier, state highway engineer, of the two days of road contract awarding November 24 and 25.

There will be 200,548 miles of 18-ft. concrete construction, 26,557 miles of 16-ft. gravel construction and 9.58 miles of graded earth.

In round figures it is estimated the cost to the state of these contracts will total $6,500,000. Much of the concrete construction will be on state highway No. 2.

Contracts were awarded November 24 on a mileage of 129.074 miles, of which 9.58 is graded earth, 26.557 gravel and 92.937 concrete.

On all of the projects the state will supply sand, crushed stone, cement and other material.

This is the largest awarding of contracts for concrete construction yet undertaken by the state and the magnitude of the commitments involved was made possible by the adoption of proposal No. 5 at the recent election.—*Kansas City Journal.*

New Sand Plant in San Diego, California

ACCORDING to the *San Diego, Calif., Union,* E. J. Klinger and E. P. Jones have put up a sand washing plant in Mission Valley, near San Diego. A cableway dragline is used in excavating the sand from the bed of the river, and the sand is washed over gravity screens after which it is rewashed in a rotary washer. Mr. Klinger was formerly chief engineer of Milwaukee county, Wisconsin.

Remarkable Increase in Value of U. S. Gypsum Company Stock

AN article, signed by Edwin G. Nichols, in the *Chicago Daily News* of November 18 in part reads as follows:

Chicago investors have participated freely in the enhancement of some $3,000,000,000 in security values which has occurred since election day. The profits, on paper or in cash, as the case may be which local investors and speculators have garnered, have come from general holdings of industrial and railway stocks, but the gain has been particularly marked in the case of some large enterprises which are Chicago owned and directed.

Take the case of United States Gypsum, which at today's price of 163, has risen 35 points since election day and 76 points since July 1 last, and other Chicago common stocks as follows:

	Price July 1, 1924	Price today	Enhancement
Internat. Harvester	87⅜	102⅜	$14,981,505
Sears-Roebuck	95	142	47,000,000
Montgomery Ward	28⅞	45⅞	20,401,267
U. S. Gypsum	87	163	22,464,080

Gypsum has made several Chicago millionaires in the last few years. Among the largest holders of the company's common stock are understood to be Sewell L. Avery, its president, who has been credited with owning as much as one-tenth of the stock, and Ralph Van Vechten, a director of the company, and vice-president of the Continental and Commercial National bank. Other big beneficiaries of the rise in this issue are J. W. Fowler, a Chicago banker; Charles W. Higley, a Chicago insurance man, and three brothers, O. B., Arthur E. and P. A. English, the latter two residing in Los Angeles. A. G. Becker and Robert C. Schaffner are understood to have been at times large holders of Gypsum common. A price of 163 for the present $20 par stock is equivalent to $815 for the old $100 par stock without making allowance for several stock dividends paid since 1920, when the par value was changed by issuing five new shares for one old.

The $100 stock formerly sold for less than $10 a share.

Congress Has Right to Issue Preference Orders for Coal

THE Supreme Court has recently decided that congress has the right to authorize the issuance by the Interstate Commerce Commission of preference orders for the use of railroad cars in times of emergency, according to Associated Press dispatches. The decision was rendered in a case where a shipment of coal was made during the shopman's strike of July, 1922, from Kentucky to Union City, Mich. It was represented that the coal was to be used in making gas, but the shipper diverted the coal and sold it to the Peerless Portland Cement Co., which used it in making cement. Avent, the man who shipped the coal, plead guilty to fraudulent representation and was fined.

Later he raised the question of the constitutionality of the order declaring that it deprived him of certain rights as a citizen, but Justice Holmes decided that in such circumstances "congress might require a preference in the order of purposes for which coal should be carried."

Death of the Founder of Rock Products

EDGAR HARVEY DEFEBAUGH, who founded ROCK PRODUCTS in 1902 and who published it until he sold it to the present owners in 1917, died in Chicago on November 22 at the Auditorium hotel. His death was very sudden, for he had been talking to friends only a few moments before he became unconscious, and he seemed to be in the best of spirits only a short time before.

Edgar Harvey Defebaugh, who founded Rock Products and published it for 15 years

To Mr. Defebaugh the various rock products industries owe much, for in addition to founding this magazine, the spokesman of these industries, he helped to found the National Lime Association, the National Crushed Stone Association and the National Sand and Gravel Association, getting leading men from each of these industries to meet with him and to organize.

In publishing circles he was well known, as he continued in the publishing business to the day of his death. He was owner and publisher of *Barrel and Box* and of the *Lumber and Veneer Consumer*, although on account of ill health he had not been active in their conduct for some months past.

His home was in Louisville, Ky., where ROCK PRODUCTS was started, but he was much in Chicago, where he had memberships in various clubs. In both cities his genial good nature and tact made him welcome and he belonged to many societies, including the Masons. He was buried at Louisville on November 24.

Planning Biggest of All Road Shows to Be Held in January

IT LOOKS as though the greatest problem facing the American Road Builders' Association is the discovery of a place big enough to hold its annual road show. When applications for space in the show, to be held January 5 to 9 in the Chicago Coliseum and adjoining buildings, were opened, it was found that the space available for heavy machinery was 200% oversubscribed and the space in which high machinery could be installed was 400% oversubscribed. It was, of course, necessary to make a uniform cut in the space applied for, but the exhibitors are co-operating with the committee in charge by curtailing their exhibits and at the same time presenting the machines and products which they know will be of most interest to those who will attend the show.

The A. R. B. A. convention, which will be held simultaneously with the road show, will be at the Congress Hotel. The program, prepared by Prof. T. R. Agg, contains a long list of subjects of vital interest to everyone engaged in road construction. The contractor, engineer, public officials, and all others active in the highway industry will find the papers and discussions of great interest.

Arrangements have been made to handle hotel reservations in such a manner that everyone will be cared for. A special hotel committee has prepared a booklet giving a list of Chicago hotels, with their rates, containing a reservation blank. This booklet will be sent to anyone who wishes it.

The entertainment committee is planning to take good care of the time not already allotted to the sessions of the convention and the road show. The delegates and guests of the association will find plenty to do every minute while they are in Chicago. The annual banquet of the A. R. B. A. will be held at the Congress Hotel on Wednesday evening, January 7. A dance at the Club Chez Pierre and the usual exhibitors' night in the First Regiment Armory near the Coliseum also are on the entertainment program.

Those who attend the convention and road show will be able to keep in touch with what is going on through *The Highwayman*, the official A. R. B. A. paper, which will be issued daily, as in the last two years. The official announcements, the program of the day, and various other matters of interest will be published in *The Highwayman*.

C. M. Upham, business director of the association, will open headquarters at the Congress Hotel on December 1. These headquarters will be maintained until the end of the convention and road show and all who desire information in regard to either convention or show should write to the American Road Builders' Association, Congress Hotel, Chicago.

Legal Battle Between Ford Road and National Quarries Company

THE battle of legal minds, arrayed by Henry Ford, owner of the D. T. & I. railroad and the National Quarries Co., opened in Probate court in Lima, Ohio, when a land appropriation suit brought by the railroad to acquire property of the stone concern was called.

The question of the jurisdiction of Allen county courts was raised at once in an objection filed by counsel for the stone company.

It was divulged at the outset that injunction proceedings have already been instituted in Federal court in Toledo, with the object of restraining Ford from running his railroad over the quarry tract, about one mile north of Lima.

Attorneys for the National Quarries Co. told Judge J. H. Hamilton they desire to have the entire proceedings transferred to United States courts on account of the difference in citizenship.

In raising the question of jurisdiction, it was stated that the position of the defendant is different from that of the usual defendant in such proceedings.

"We do not want to sell our property," attorneys told the court, "we want to keep it."

The average defendant, it was stated, accepts jurisdiction, because he wants to sell, but cannot obtain a sufficient price. In this instance it was argued the defendant does not acquiesce to allow the court or jury to fix the value of the land desired by the railroad company.—*Lima (Ohio) News.*

Looking for a New Type of Road

THE following bulletin is officially issued by the Highway Research Board of the National Research Council:

"The Highway Research Board of the National Research Council at its fourth annual meeting to be held in Washington December 4 and 5, is emphasizing the need of a new type of road that will provide a good surface for secondary traffic, yet low in first cost and maintenance.

"The secondary and local roads of this country have a far greater mileage than the main traffic lines, yet relative to very large mileage little progress has been made along the lines of improving this type of construction. Because of the small amount of traffic on the local roads, surfaces such as concrete, asphalt, and brick are not possible because of the great cost of building the hard surfaced types.

"Many communities do not have available deposits of natural road building materials and consequently the construction of secondary roads has not kept pace with the demand for a serviceable road that will provide a good surface to traffic every day in the year. A large number of states have constructed these local roads of broken stone, gravel, or of selected soil such as sand-clay or top-soil. It has been definitely proven that when a gravel or selected soil road carries more than 500 vehicles a day, this type of road surfacing is unsatisfactory. The surface becomes rough and corrugated and it requires much work on the part of the maintenance forces to put it in good shape.

"Several state highway commissions have been experimenting with various materials to determine a method of constructing a road that will cost even less than for a gravel road, yet be more satisfactory. In one state the so-called "veneer" type of road has been built and it shows great promise. This type is built by placing three inches of 2 to 2½-in. stone directly upon the shaped road surface and rolling it into the soil so that the stone is properly keyed to the subgrade. Then a light coating of asphaltic road oil is poured on to the stone and this is then followed by placing smaller stone on the surface to prevent the passing cars from "picking up" the asphalt. These smaller stone also wedge into the larger ones underneath, thus forming a hard, dense layer. Other types of construction, such as the sand-asphalt and marl-asphalt are being tried; both of these types utilizing local material incorporated with small amounts of asphalt to serve as a binding material.

"The Highway Research Board is calling attention to the fact that while all present research work should continue, the need of a low cost, serviceable road is needed so that the local farm roads may be brought into conformity with the increasing demand of traffic. Some method of stabilizing ordinary earth, particularly in wet weather, is needed to answer this problem. Low cost of construction is demanded together with a low maintenance cost. Hard surfaced roads have a high first cost with a low maintenance charge; gravel and selected soil roads have a low construction cost, but a high maintenance cost. What road surface has a low first cost, low maintenance cost and will carry fairly heavy traffic?"

Roofing Company Makes State Granules in Utah

ACCESS to the present good market for roofing material in Salt Lake City, Utah, and in the intermountain country, plus the proximity to a raw material in the natural colored and state rock of Utah induced the American Asphalt Roof Corporation to install a roof material manufacturing plant in Salt Lake. The manufacturing plant, starting operation April 1, is at present turning out 1200 squares, of 108 sq. ft. to the square, each day, with prospects for increasing the capacity of the factory and the possible installation of an asphalt producing plant.

Natural colored and slate rock is furnished from Utah. The company operates its own crusher in the making of granules necessary in the manufacture of roofing material. Natural colors obtained from the use of the Utah rock are red, green and blue-black. Other raw materials are shipped in. The new Salt Lake industrial unit includes an extensive storeroom, a rock-crushing plant, and the production plant.

R. L. Goddard is general manager and W. H. Whitcraft is superintendent and production manager. A. E. James is office manager.—*Salt Lake City (Utah) Tribune.*

Monmouth Stone Company's Plant to Be Sold

THE defunct Monmouth Stone Co. plant, at Gladstone, Ill., will be sold on Monday, December 1, it was announced at a meeting of the Bondholders Protective company held recently. The concern is now in bankruptcy.

The Monmouth Stone Co. plant was valued at between $300,000 and $400,000.—*Galesburg (Ill.) Republican.*

County Rock Plant Employs Convict Labor

THE Buncombe County rock crushing plant near the Buncombe prison barracks at Craggy, N. C., began operation recently. The capacity is from 300 to 350 tons a day.

About 40 men, mostly county convicts, will be employed at the plant when in full operation. The cost was around $15,000. The material will be used in county road construction work, according to an Asheville, N. C., paper.

Morris Stone Company Asks Charter in Georgia

A PETITION of C. A. Morris, E. L. Morris and M. E. Morris, all of Macon, was filed in the office of the clerk of the superior court recently asking that they be incorporated under the firm and style name of the Morris Stone Company, with offices in Macon, Ga., for the purpose of carrying on a business of excavating, digging and mining stone, rock, sand, clay and gravel.

It is stated the capital stock of the new concern, paid in, is $50,000, and the petitioners ask the right to increase it to $500,000 if they so desire.

They also desire the privilege of buying, selling, owning and dealing in real estate, mortgages and like properties. They seek the charter for a period of 20 years.

C. A. Morris, named in the above, was formerly president of the American Lime and Stone Co., Bellefonte, Penn., and E. L. Morris, his son, known to his many friends as "Bud" Morris, until recently was superintendent of the same company.

Statistics of the Cement Industry

THE Department of Commerce announces that, according to the data collected at the biennial census of manufactures, 1923, the establishments engaged primarily in the manufacture of portland, natural, puzzolan and high-temperature cements in that year reported a total production valued at $285,050,551, an increase of 40% as compared with $203,626,929 in 1921, the last preceding census year. The quantities and values of the principal products were as follows: Portland cement—137,460,238 bbl., valued at $278,732,025, an average of $2.02 per barrel; natural and puzzolan cement—1,325,465 bbl., valued at $2,061,894, an average of $1.55 per barrel.

Of the 138 establishments reporting for 1923, 23 were located in Pennsylvania, 14 in Michigan, 12 in New York, 9 in California, 8 in Kansas, 7 in Ohio, 6 in Alabama, 5 each in Illinois, Indiana, Iowa, Missouri and Texas, and the remaining 34 in 15 other states.

The statistics for 1923 and 1921 are summarized in the foregoing statement. The figures for 1923 are preliminary and subject to such correction as may be found necessary upon further examination of the returns.

	1923	1921	Pct. of increase[1]
Number of establishments	[2]138	125	10.4
Wage earners (average number)[3]	35,116	26,231	33.9
Maximum month	Aug. 37,462	Sept. 28,043	.....
Minimum month	Jan. 31,138	Jan. 22,198	.....
Per cent of maximum	83.1	79.2	.....
Wages	$49,740,985	$34,415,677	44.5
Cost of materials (including fuel and containers)	$121,333,894	$102,359,637	18.5
Products, total value	$285,050,551	$203,626,929	40.0
Portland cement:			
Barrels	137,460,238	95,507,147	43.9
Value	$278,732,025	$180,778,415	54.2
Average value per barrel	$2.02	$1.89	.....
Natural and puzzolan cement:			
Barrels	1,325,465	539,402	145.7
Value	$2,061,894	$897,025	129.9
Average value per barrel	$1.55	$1.66	.....
All other products, value	[4]$4,256,632	$21,951,489	—80.6
Value added by manufacture[5]	$163,716,657	$101,267,292	61.7
Horsepower	644,038	([6])	.....
Coal consumed (tons of 2000 lb.)	8,444,609	([6])	.....

[1] a minus sign (—) denotes decrease.
[2] Comprises 126 establishments reporting portland cement as principal product, three of which also reported natural cement; seven reporting natural cement as principal product, and five reporting high-temperature cement.
[3] Not including salaried officers and employees nor proprietors and firm members. Statistics for these classes will be given in final report.
[4] Includes high-temperature cement valued at $535,501.
[5] Total value of products less cost of materials.
[6] Not reported.

Kansas Introduces New Abrasive Test for Concrete

A SPECIAL test for abrasive strength of concrete has been evolved at Kansas State Agricultural College known as the ball test. Previously tests have been made to determine strength of materials used in making concrete but, so far as station officials know, this is the first attempt at a college laboratory to develop an abrasion test for concrete itself.

In 1921, Prof. C. H. Scholer of the applied mechanics department, inaugurated the ball test. It is carried out by first making a sphere of concrete of a mix which is desired to be tested for use in road construction. The sphere is cast 9 in. in diameter. When the ball of concrete is taken from the mould it is stored in damp sand for 28 days, then air cured for 32 days.

After the curing process the concrete balls are put in a cylinder which contains 300 lb. of shot. Ten of these shot are 3 in. in diameter and the remainder are 1½ in. in diameter. The cylinder is revolved 900 times at a speed of 30 r.p.m. After this the concrete balls are weighed and the per cent of loss calculated. Cylinders then are cut from the spheres and tested in the compression machine. The test is expected to determine what relationship, if any, exists between abrasive resistance and compression strength of concrete.

Data accumulated so far are not complete as it took a long time to develop the method, technique, kind of forms, length of time to cure the concrete, and other particulars of the test. Some general conclusions have been reached, however, according to Prof. H. Allen. The method also has been used in trying out commercial preparations which are claimed to increase the wearing value of concrete. Recently 100 concrete balls coated with such a preparation were tested. —*Industrialist, Manhattan, Kansas.*

Legitimate Trade Association Activities Should Be Defined

"ONE of the most important agencies through which the elimination of waste may be promoted is the trade association," says Secretary Hoover, in his annual report of the Department of Commerce. "It is true that a small minority of these associations have been in the past used as cloaks for restraint of trade by such activities as open-price associations and other attempts to control distribution or prices. It is equally true that the vast majority of trade associations have no such purpose and do no such things. The dividing line, however, between what activities are in the public interest and what are not in the public interest is not today clearly defined either by the law or by court decision.

"In consequence of recent decisions of the courts many associations are fearful of proceeding with work of vital public importance, and we are losing the value of much admirable activity. At the same time we are keeping alive the possibility of wrongful acts. It is imperative that some definition should be made by which an assurance of legality in proper conduct can be had, and by which illegality or improper conduct may be more vigorously attacked.

"Any collective activity can be used as a smoke screen to cover conspiracy against the public interest, but that is no reason for condemning all collective activities. Just because automobiles are sometimes used by bootleggers for the illegal transportation of liquor we do not prohibit their manufacture or their legitimate use.

Big Cement Products Plant Burns

THE Spencer, Iowa, plant of the Cement Products Co., once said to be the biggest cement tile factory in the world, was reduced to roofless walls and ruined machinery recently by a fire.

The fire started apparently in an empty curing room near the center of the plant, and spread rapidly until the wooden roofs were an acre of flame. The upper part of the manufacturing room, running from north to south through the middle of the plant, was soon blazing and it was not long before the roof fell down upon the conveyors, motors and other equipment below.

From there the fire leaped north to the top of the high wooden tower and destroyed the hoisting and separating machinery used in grading the gravel and sand.

Most of the fuel on which the fire fed was furnished by the light wooden roof that extended over all the buildings of the plant. The walls are concrete and they remained standing. There were thousands of dollars worth of tile in the curing rooms and a large part of it was probably damaged by the heat.

J. J. Radford, president of the Cement Products Co., said the plant was insured against fire for $13,000. He would not undertake to estimate the loss, but it is safe to say the $13,000 was only a fraction of it. —*Spencer (Iowa) Reporter.*

Cost and Profit From Using Agstone

EXPERIMENTAL results obtained by the Illinois College of Agriculture fix the value of limestone, as measured by increased crop yields in good farm practice, at about $10 a ton in central and northern Illinois. The lime being used in Henry county is costing $1.20 to about $1.75 a ton. The cost of hauling and spreading is additional, of course.

About 32,000 tons of agricultural limestone were used in Illinois in 1911; 500,000 tons will be used in 1924, it is estimated.—*Wyoming (Ill.) Herald.*

Aeroplane view of the portland cement plant of the Louisville Cement Co. at Speeds, Ind.; this is near the site of the old natural cemen
system of evolution the manufacture of natural cement changed to the manufacture of portland cement an

natural cement plant, which was the first cement plant of any kind established west of the Lehigh Valley and New York State. By a d cement and the portland cement plant from a pioneer type to a modern type with waste-heat boilers

German Cement Manufacturers Visit Plants in the United States

Eight leading representatives of the portland cement industry in Germany gave vent to undisguised amazement and admiration early in November when taken for a tour over the concrete highways of New York, Pennsylvania and New Jersey and to visit some of the cement mills in this country. These matter-of-fact German manufacturers and scientists freely admitted that they were far behind the times in developing markets for their product and that they were in this country to get ideas.

En route to Washington from New York, they were entertained in Philadelphia at the Manufacturers Club by Morris Kind, president of the Hercules Cement Corporation; Charles H. Cox, sales manager of the Phoenix Portland Cement Co.; T. O. Bretherton, secretary and sales manager of the Penn-Allen Cement Co.; Haydon Gaines, sales manager of the Bath Portland Cement Co., and L. N. Whitcraft, district engineer of the Portland Cement Association.

In Washington the German cement men visited the Bureau of Standards and the Bureau of Public Roads. Dr. R. H. Bogue, research director of the Portland Cement Association Fellowship, and P. H. Bates, chief of the division of structural engineering, conducted the party through the Bureau of Standards.

Dr. Engineer Peter Hans Riepert, who acted as spokesman for the party, said the association of German cement manufacturers was about to launch an educational campaign similar to that carried on in this country by the Portland Cement Association In 1923 40,000,000 barrels of cement (376 pounds each) were made in Germany, which is one-half normal production. A considerable portion was exported. There are no concrete roads or streets anywhere in Germany; but reinforced concrete and pre-cast concrete stone are said to lead in the construction of industrial and office buildings.

Others in the party were Dr. Engineer Heinrich Mueller, chairman of the Association German Portland Cement Manufacturers; Dr. Gustav Haegermann, chief of the German Cement Association's laboratory; Dr. Nicolas Simon, of the Silesian Portland Cement Works; Dr. Hubner, of the Balingen Portland Cement Works; Dr. Schwenk of the Portland Cement Works at Ulm; Ernest G. W. Pruessing, director of the Portland Cement Works at Nienburg and Dr. Erhart Schott, representative of the South German Portland Cement industries.

All of these men, mostly men of middle age and older, saw active service in the war. They averred that they bore no animosity whatsoever toward this country, and expressed deep appreciation of the manner in which the Quakers of Pennsylvania had relieved the sufferings of the children in their country.

From November 17 to 20 the Germans attended the annual meeting of the Portland Cement Association in Chicago. There Dr. Hagerman contributed a paper on the high early strength portland cements that are being made and tested in Germany.

Nebraska Sand and Gravel Producers Win Joint Rate Case

NEBRASKA sand and gravel producers have secured an order from the state railway commission compelling the railroads to put into effect joint rates on sand, gravel and stone, crushed or pulverized, over not more than two carriers at rates of one cent per hundred pounds over the single line haul now in effect for equivalent distance.

Complaints had gone to the commission that joint rates were particularly high to points where gravel was needed for highway construction.

John Ehernberger, of the Platte Valley Sand & Gravel Co., was one of the prime movers in this case.

The commission said that joint rates were not apparently essential on these commodities so long as their use was as restricted as it was before the advent of much highway hard surfacing. The use of gravel on highways has made a tremendous tonnage increase to widely separated points, many of which would formerly only buy a carload. This will be greatly increased in the next five years, and the commission says that it is proper that points where joint rates would be advantageous should have them.

Southern Asphalt Company to Make Large Improvement

AN expenditure of around $300,000 by the Southern Asphalt Co. on its property at Albany, Ala., has been announced by M. S. Bingham, Morgan county road engineer. Mr. Bingham stated he understood a part of the expenditure was to be for a spur railroad to connect the L. and N. railroad at Flint, six miles south of the Twin Cities with the mine of the asphalt company at Wiggins Mountain. Another part of the expenditure is to go for a modern asphalt plant to be erected at the mine.—*New Orleans Journal of Commerce.*

International Cement Company Stock Dividend

DIRECTORS of the International Cement Co., New York City, have declared a common-stock dividend of 10%, in addition to the regular quarterly distributions of $1 a share on the common stock and $1.75 a share on the preferred, all payable December 31 to stock of record December 15.

Changes in Big Tejunga Rock and Gravel Company

ACCORDING to an official announcement, L. J. Killian has sold his interest in the Big Tejunga Rock and Gravel Company, Inc., of Los Angeles, Calif., to Guy R. Varnum, president of the company, and J. G. V. Clarke, president of the Clarke Rock and Gravel Co.

Mr. Varnum, who already owns a large majority of the stock in the company, has been its president for about three years. He has had a lifelong experience in the rock business, and also owns considerable interest in one of the largest granite quarries in the East.

Associated with Mr. Varnum in the management is T. F. Fournier, who has also purchased an interest. Mr. Fournier is a mechanical engineer, and during the past few years has been consulting engineer, advising on production and financial methods of manufacturing plants.

During the past two years the plant, about 15 miles from Los Angeles, has been completely rebuilt, and the production increased from 30 yd. per hour to 160 yd. A modern washing plant has been installed.

The office of the company is located at 1816 Cahuenga avenue, Hollywood, Calif., and the officers of the company are now as follows: Guy R. Varnum, president and manager; J. G. V. Clarke, vice-president; T. F. Fournier, treasurer and assistant manager; J. C. Miles, secretary.

Missouri Valley Association Meets Dec. 16 and 17

THE secretary of the Missouri Valley Association of Sand and Gravel Producers writes Rock Products that the annual meeting this year will have an especially good program. Members are requested to communicate with the secretary for hotel reservations. The association will convene at Hotel Muelbach, Kansas City, Mo., at 10 o'clock, December 16. Entertainment will be provided as usual by the Kansas City producers.

Sand and Gravel Company Establishes Fellowship at University of Michigan

THE United Fuel and Supply Co. of Detroit, which is one of the larger producers of sand and gravel in Michigan, has recently established a fellowship in highway engineering to be devoted to investigations under the direction of the division of highway engineering and highway transport of the University of Michigan covering advisable methods of sampling and testing sand and gravel to be used in connection with highway improvement. The United Fuel and Supply Co. fellow will make an extensive investigation of plant production of sand and gravel prior to determining efficient methods of sampling.

Cement Products

TRADE MARK APPLIED FOR WITH U.S. PATENT OFFICE

Concrete Brick from Silica Sand

Atlanta Sand and Supply Company Utilizes the Unusual Qualities of Its Sand for Making Cement Products

THE Atlanta Sand and Supply Co. of Atlanta, Ga., produces sand which is almost pure silica from its pits at Rollo, 96 miles out of Atlanta. It sells this sand—and a lot of it—for use in concrete, wall plaster and the various other uses to which sand is put nowadays. In the course of investigating the properties of the sand it was found that the mortar made by mixing it with portland cement and water had a somewhat extraordinary strength both in tension and compression tests. This naturally suggested its use in some manufactured product and after due investigation a concrete brick plant, employing the Shope process, was built.

As in almost every city in the United States there has been a plague of "wayside pit" and similar small bore producers of sand in Atlanta. Much of the sand produced by these was quite unfit for making concrete. A. P. Burke, the manager of the Atlanta Sand and Supply Co., had a series of samples taken from a dozen or more piles from which sand was being used in work that was in progress at the time, and sent them together with his company's Rollo sand to the laboratory of the Georgia Institute of Technology. When the results of these tests were plotted the variation between the strengths of the various sands was astonishing. The strengths ran all the way from 53% to 174% of the strength of standard Ottawa sand tested at the same time.

It is unusual to make concrete brick of sand without any coarse aggregate. In fact with ordinary sands it would be too expensive. This is easily shown by a reference to the tables for designing concrete mixtures. To make a 1500 lb. concrete with only sand from 0 to 8 mesh requires 1 part of cement to 3.8 parts of aggregate for a 1-in. slump. But if ⅛ to ⅜-in. grains are added in the proper proportion the same cement will serve for 5.1 parts of aggregate. The saving in cement by using the coarser aggregate is approximately 25%, but the above does not apply to Rollo sand.

The curious fact about this Rollo sand is that while practically all of it passes a 10 mesh screen its modulus of fineness exceeds 2.5. This is shown in the following screen analysis:

Brick plant of the Atlanta Sand and Supply Co. The upper floor houses the mixers; the lower floor and the long shed at the rear, the brick-making machines

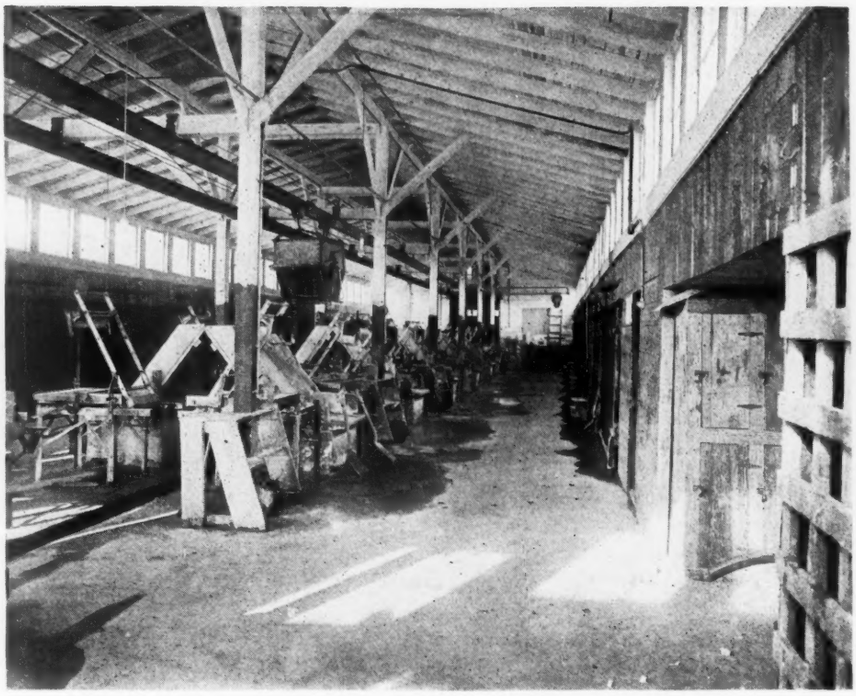
Mesh	Per Cent	Cumulative Per Cent
— 8+ 10 mesh	1.5	1.5
— 10+ 20 mesh	19.0	20.5
— 20+ 30 mesh	22.2	42.7
— 30+ 40 mesh	13.5	56.2
— 40+ 50 mesh	14.9	70.7
— 50+ 80 mesh	21.4	92.1
— 80+100 mesh	3.4	95.5
—100+200 mesh	4.0	99.5
—200 mesh	0.4	99.9

The sand of which the analysis is given above represents the average of 25 cars. In tensile strength it tested (in a 3-1 mortar) 149% of standard Ottawa sand in seven days and 150% in 28 days. A 2000 lb. concrete can be made with it, using one part of cement to six of sand. A one to eight mixture will make a brick that will meet specifications for strength and if a little coarse aggregate is added a one to nine mixture may be used. But it is difficult to buy the right sort of coarse aggregate for concrete brick in Atlanta and the appearance of the brick is better where sand alone is used, so the brick is made with only sand and cement.

The plant is situated in Atlanta not far from the heart of the city. It is well-built and has ample storage yards which are paved. A considerable part of the stored brick is protected by sheds.

The layout and handling system of the plant is excellent. Materials are brought in by an elevator to the upper floor and the concrete is mixed in Blystone mixers. It is distributed to the brick machines by a monorail system with a traveling bucket. This bucket dumps the mixed concrete to the machines as they need it. Hand tamping is used throughout the plant and the colored face is applied in the usual way and brushed or "wire cut," according to the face that is required. Colored labor is employed for brick making and is found satisfactory.

The mineral colors are ground in a small mill in the mixing room on the upper floor and some of the sand is ground in with the colors. As the sand is a pure quartz the color is unchanged, and it is surprising how large a proportion of the sand may be added without making the color lighter. This is explained by the fact that the color coats the surfaces of the grains even though they are screened very fine.



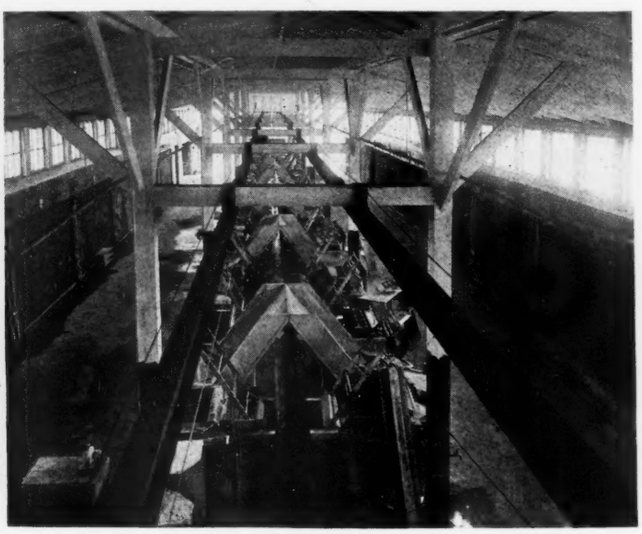
Interior of brick plant showing traveling bucket by which mixed concrete is fed to the machines

The surfaces of the brick made with this mixture of quartz and color are exceedingly hard, so hard that it is difficult to scratch them with a knife. Mr. Burke has actually suggested that a driveway be paved with face brick as a test for their strength and wearing qualities.

In addition to the faced brick made under the Shope patents, some brick have been made with the mineral color mixed into the concrete so that the brick is the same color throughout. But the main product of the plant is faced brick in many shades and colors. Among the samples shown was a very close imitation of "kiln eye" clay brick, the overburned brick that varies in color from a metallic black to a rich red.

The capacity of the plant is 50,000 brick per day and the product is used in and around Atlanta. Concrete products are having a great run in some parts of the south at this time, due to the use of so much concrete brick and block in Florida where house-building has been carried on at a feverish pace the past year.

A. P. Burke is president and manager of



Left—The mixing room on the upper floor. Right—Looking down on the block machines from the upper floor

Left—An excellent imitation of kiln-eye brick. Right—Exhibit of samples of various colored bricks

the Atlanta Sand and Supply Co.; J. B. Campbell is vice president, and R. R. Johnson is secretary and treasurer. The company's pit at Rollo is worked by hydraulicing, the sand being merely washed down from the bank and flumed to the cars, one of the simplest sand operations in the country.

J. W. Herman is in charge of the brick plant. Mr. Herman was formerly in the clay brick industry and understands the brick business from both angles.

Making Concrete Pipe in Florida

W. J. McCracken, president of the Florida McCracken Concrete Pipe Co., came to Tampa about a year ago from Sioux City, Iowa, and commenced the building of a plant for making concrete pipe, which took three months. When it was completed with a capacity of eight carloads a day, Florida business kept it running to full capacity. A similar plant was erected at Sanford where the factory has been turning out seven carloads a day to take care of the business in that section.

The Florida factories are only two of the 20 big plants making McCracken concrete pipe in different sections of the United States and Canada.

In a recent interview Mr. McCracken said:

"Wherever possible we are buying all raw material in the state of Florida to further reduce the cost of transportation, and we are now getting the finest grade of sand I have ever handled from Lake Wales. This sand is really a fine crystal, a quartz sand, which gives to concrete a tensile strength impossible to get from sea sand or from a great many other sands. To get gravel we have to go further away, getting it from the Escambia Sand and Gravel Co. at Tarzan, which is north of Pensacola.

"The machinery is all automatic, the pressure being exerted with a rotary motion, which packs the material very hard and produces a glaze on the inner surface of the pipe that is smooth and water tight.

"When shaped, the pipes are submitted to a spray process for 48 hours, and a curing process by exposure for 28 days. The manufacturing process of each length of pipe only consumes 45 seconds.—*Tampa Tribune.*

Lansing, Michigan, Kills Ordinance for Regulating Cement Products

ALDERMAN William H. McKale of the Third ward of Lansing, Mich., branded a proposed ordinance to regulate the size, quality and texture of cement block used in city building as an abridgment of personal rights and the measure died temporarily in the committee of the whole.

The proposed ordinance called for a high pressure and moisture test, Alderman McKale said. "That ordinance would throw all cement block making in the city into the hands of a few manufacturers who could afford to buy machines for block making. It would prevent the home owner and any other small contractor from making his blocks by hand if he desired."—*Lansing (Mich.) News.*

Effective Promotion of Stucco and Concrete Construction!

WHAT is St. Louis going to do about this demand? It comes from the painters' union:

Wages $12 a day.

No work on Saturday, Sunday or at night unless the pay is made $24 per day.

A job steward is to be placed on each job. He cannot be removed before the completion of the work unless he is found guilty of incompetence or dishonesty by his own union. (Ye gods!)

Men at work on buildings four stories or over must be paid 15 cents an hour extra. Every painter on the job must get it.

Where two men work they must have a foreman to supervise them. He must get $1.50 per day more.

When painters go out of the city they must be paid $15 a week extra for their board.

Contractors must furnish rubber gloves to the painters.

No painter must enter a shop before 7:45 a. m. nor must he be found there after 5 p. m. If they work in the suburbs they must not leave the city before 7:45 a. m.

If the job doesn't last the whole day the painter must be paid the full day's wage.

Since there is a strike on, every union painter must pay $3 per day into the painters' district council.—*Builders' Record.*

Report of the Joint Committee on Concrete

THIS report embodies the work to date of the joint committee, made up of representatives of various engineering societies. It is the latest of several reports that have been issued by the same body and it contains standard specifications for concrete and reinforced concrete. In its 152 pages it probably contains more important information relating to materials for concrete and the placing of both plain and reinforced concrete than is to be found collected elsewhere. The book is submitted to constituent organizations by the American Concrete Institute.

Tons of Material Used to Plaster a New York Hotel

Into the walls of the 1100 guest rooms and the public rooms of the Hotel Roosevelt of New York, were put 5500 tons of sand, 600 tons of lime 1700 tons of water and 2500 tons of gypsum, in the form of plaster. Of the 1700 tons of water used for the base-coats only 330 tons remain.—*New York Tribune.*

Sand-Molded Concrete Blocks

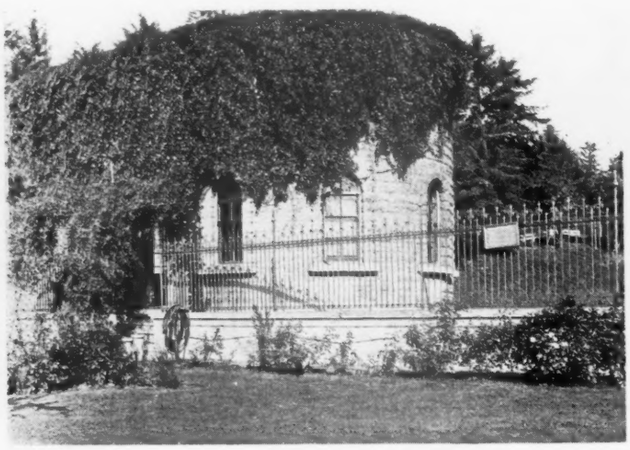
A STRIKING illustration of the splendid adaptability of sand molds to use in casting veneered cement blocks for imitation stone block construction is the new intake gate and screen house recently completed by the J. W. Sadler Co., contractors and engineers of Portland, Ore., at one of the municipal reservoir sites of that city. The city wanted a building of monolithic concrete construction with a cement block veneer surface in imitation of a nearby stone veneered meter house that had been built a few years earlier and had received a hand chipped veneering when labor costs were nearly 50% cheaper than now.

Since the sum appropriated for the construction of the building precluded hand chipping, L. E. Bufton, a fellow contractor, suggested casting veneered cement blocks in sand molds. He was placed in charge of this part of the work, and not only was the cost of construction held well within the amount appropriated for the building, but also the resemblance of the imitation stone surface of the new building when completed to the real stone of the old meter house was almost perfect. The cause of this striking resemblance was accounted for in the use of the sand molds, for a certain amount of free sand from the molds had adhered to the veneered surface of each block as it was cast, producing a soft grained velvety sand finish similar in appearance to stone.

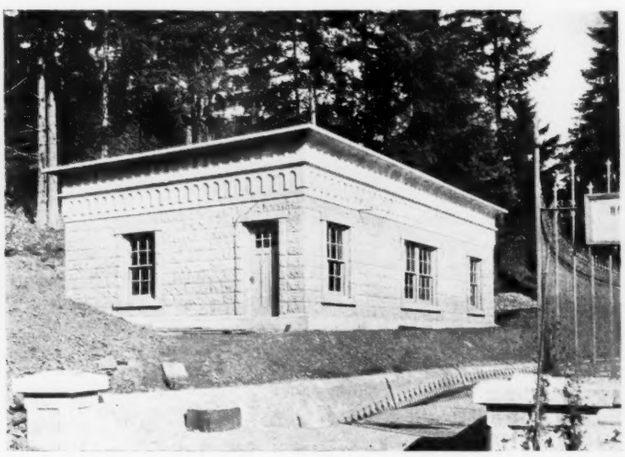
The pattern for the molds in which the veneered blocks were cast was made of portland cement in combination with plaster of paris and the cement used in pouring the blocks was a 1-2-4 mix, a grade which could not have been satisfactorily veneered by chipping.

Another procedure of the builders which aided in keeping the cost of construction low was to first build up the skeleton of the house with the cast blocks and then pour the main cement wall against its inner surface. Forms were unnecessary on the exterior surface of the pouring and anchors of wire and steel rods projecting from behind and between the blocks in the outer veneer skeleton bound the two walls together closely.

When the new building was finished it was found that as much had been accomplished for $1800 by casting the blocks with veneered surfaces as would have cost nearly $5000 by the hand chipping method. This same method of sand molding has been used by Mr. Bufton with great success in erecting highway mile posts.



Original structure from which molds were made



Completed structure, faithful replica of original surfacing

Seattle Passes Ordinance Permitting Use of Concrete Building Tile

AFTER several months of investigation the city building code revision commission of Seattle, Wash., approves certain changes in the existing code providing for the use of concrete tile heretofore not permitted locally. Extensive studies as to the load-carrying capacity and fire-resistant qualities of concrete tile were made and it was voted 16 to 3 by the commission to allow the use of the concrete product.

It is recommended by the commission that the proposed ordinance require 1½-in. webs on all concrete tile for bearing walls, except in residences, wherein 1-in. webs are permitted. It is also suggested that 1-in. webs be permitted for non-bearing and filler walls. The 1½-in. web concrete tile was given the same rating as terra cotta tile, which is now used for bearing and non-bearing walls, according to Secretary Fowler of the commission.

The recommendations concerning concrete tile will be sent to the council immediately, as the matter was first presented to the council by those favoring the use of concrete tile, and the commission was requested by the council to investigate the matter and submit its report.

The building code revision commission has rendered the city valuable service in modernizing Seattle's building ordinance.—*Seattle Journal of Commerce.*

Rapid Concrete House Building

BUILDING sites are plentiful in the Florida resorts, and Florida contractors have so developed the business of building a house that it seems more like a natural force than a human operation. The feverish speed with which a mushroom emerges from nothing and reaches maturity is almost being rivaled by the indecent rapidity with which Florida houses attain their growth.

A Florida house builder runs some cement out on the ground to serve as a foundation, slams up a framework to which he nails black paper with a chicken wire attachment, slaps two or three layers of cement on the chicken wire and thus apparently obtains a full grown and highly successful residence in the time that a northern contractor or builder occupies in getting the blue prints unrolled.—*Kenneth L. Roberts in the Saturday Evening Post.*

"Tilite," a Concrete Product

EFFORT is being made at this time to locate a plant at Monroe, La., which would have a capacity of 25,000 daily output of a newly patented building block. This block is said to be similar to marble.

The product is the work of many years of experimentation by its originator, C. E. Wright. It is named "tilite" and is composed of sand and cement prepared in a secret process.

That this product will take a much superior finish to ordinary cement, or even brick, is declared assured and that its wearing qualities are far superior is declared. Fourteen colors and designs are employed in the manufacture.

This product is now being manufactured in Alexandria where a factory was recently established. Laurel, Miss., has signed up for a similar one and it is hoped that Monroe will be the third in the South to establish a plant which it is asserted will give work to a number of persons and will furnish a material that will be quite extensively used locally.—*Monroe (La.) News-Star.*

First Use of Special Gun to Remove Cement Kiln Obstructions

IN its issue of April 5 ROCK PRODUCTS published a description of a gun used to shoot clinker rings from cement kilns. The method is now in regular use and the following account of a trial of the first installation, made in October, has been furnished ROCK PRODUCTS by George H. Garrison, sales manager of the Remington Arms Co.

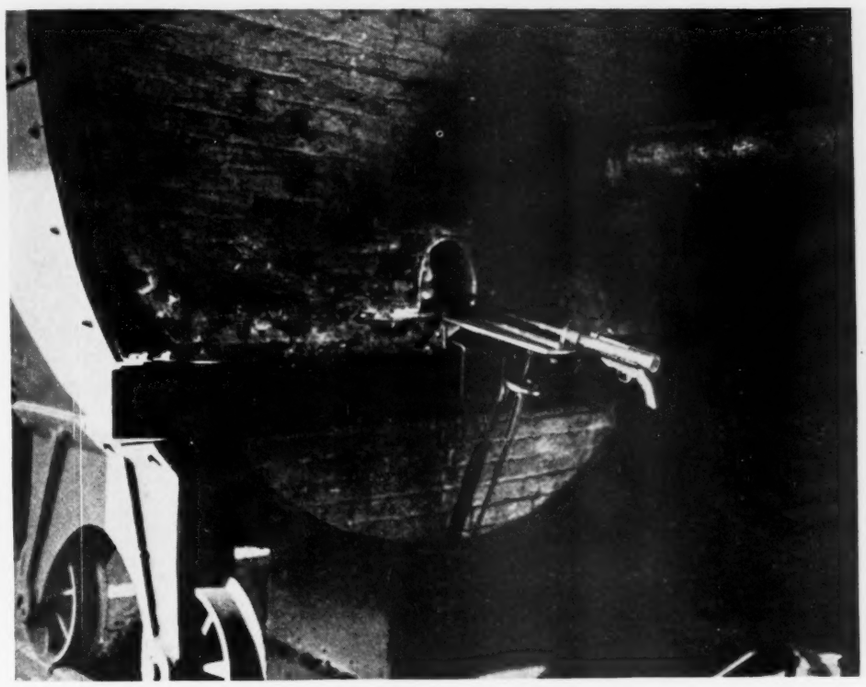
"Replying to your letter, the writer wishes to say that he has just returned from a visit of three days to the Acme Cement Corporation's plant at Catskill, N. Y., in which plant has been installed our first clinker gun.

"During that time we were fortunate enough to encounter a very severe closing up of one of their kilns by a ring some 40 feet from the outlet. The writer opened up a passage-way on one side of the same to the extent of 4½ ft., up to the face of the lining, with 55 shots, consuming between 20 and 25 minutes. This was at 10 a. m. The production was then resumed. At 3 p. m. the fuel was shut off, to examine the obstruction, and it was found that the blast had eaten away the edges of this opening to the extent of 1½ to 2 ft. on each side, in addition to the material removed by the gun.

"Desiring to have the night and day foremen become familiar with this method of removing the rings, the gun was turned over to these employees, who started and stopped the kiln and fired additional shots to practically remove the obstruction around the whole surface of the kiln. This was done more to break in the men than for any other reason, its being explained by the factory superintendent that, in his opinion, in a few hours' time the blast would entirely eat away what remained of the original obstruction. This experimental work, however, consumed 55 more shots, leaving the kiln practically clean.

"It seemed to be the impression of the plant officials that the test had proven entirely satisfactory. They have arranged to keep the gun as regular equipment in order to remove the annoying obstructions.

"This plant has placed on the face of each kiln an I-beam, bolted to the hood, which will be left in place permanently. On this I-beam is attached a simple means of mounting the gun. It requires but 15 or 20 seconds' time to be ready to fire the first shot, and the gun can be almost instantly removed and taken away."



An I-beam is permanently fixed in front of the hood. The gun may be quickly attached to and detached from this beam

The Newest Use for Fine Sand

PROBABLY no sand producer will get rich by supplying sand for dispelling fogs, but the method of using it seems to have been developed to success, and it is to be expected that it will be applied to cities that suffer from fogs, especially those having harbors. Hugh Haddow has already sold fine sand from his plant at Milville, N. J., to the government for this purpose. The following report of the latest tests was sent out by the Associated Press:

"Extensive experiments in the destruction of fogs and clouds by the use of electrified sand are to be carried out, under government supervision, at Bolling field.

The gun and mounting

"The two aviators who conducted the attack today obtained a fair "bag" despite the extreme height of the clouds over the field. A group of officers and civilians from the ground could follow without difficulty the cutting off of a cape or peninsula of cloud and its subsequent disintegration. Larger masses were criss-crossed with lanes through which the sun's rays shone to accelerate evaporation.

"The method has been patented by Dr. L. Francis Warren, who thus describes it:

"We fill the sand tanks on the planes with 120 mesh silica sand, the planes being equipped for charging the sand either positively or negatively by the turn of a lever; the sand impinging upon charging plates or falling through charging nozzles and being scattered by the air, driven back by the plane propeller.

"Commercial rainmaking now lies within the grasps of man, and he can employ to this end one of nature's cheapest commodities—namely: common or garden silica, at a cost of about $3 per ton.

"Two of the larger planes would be quite sufficient to entirely squelch a dense fog covering 117 square miles or more (an area equal to that of the city of London), or a fog covering the city and harbor of New York."

The Rock Products Market

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:			1.30 per net ton all sizes			
Buffalo, N. Y.			1.75	1.50	1.50	
Chaumont, N. Y.	1.00		1.25	1.25	1.25	1.50
Cobleskill, N. Y.	1.25	1.25				
Coldwater, N. Y.			1.50 per net ton all sizes			
Columbia, Ill.	1.10	1.20	1.35	1.35		
Eastern Pennsylvania	1.35	1.35	1.45	1.35	1.20	1.20
Munns, N. Y.	1.00	1.40	1.40	1.30	1.35	1.35
Northern New Jersey			1.60		1.30	
Prospect, N. Y.	1.00	1.40	1.40			
Walford, Penn.		1.35		1.30	1.30	
Watertown, N. Y.	1.00		1.75	1.50	1.60	1.60
Western New York	.85	1.25	1.25	1.25	1.50	1.50
CENTRAL					1.25	1.25
Alton, Ill.	1.50		1.50	1.25		
Bloomville, Middlepoint, Dunkirk, Bellevue, Waterville, No. Baltimore, Holland, Kenton, New Paris, Ohio; Monroe, Mich.; Huntington, Bluffton, Ind.						
Buffalo, Iowa	1.00	1.10	1.10	1.10	1.00	1.00
Chicago, Ill.	.90		1.25	1.05	1.10	1.10
Cypress, Ill.	.80	1.00	1.00	1.00	1.00	1.00
Dundas, Ont.	1.25	1.30	1.25	1.25	1.25	1.15
Greencastle, Ind.	.75	1.00	1.00	.90	.90	.90
Lannon, Wis.	1.25	1.25	1.15	1.05	1.05	1.05
Linwood, Iowa	.80	1.00	1.00	.90	.90	.90
Northern Wisconsin	1.00	1.25	1.25	1.05	1.05	1.15
St. Vincent de Paul, P. Q.	.75		1.05	.95	.95	
Stone City, Iowa	.75	1.25@1.45	1.10	1.00	1.00	1.00
Toronto, Canada	.75		1.20†	1.10	1.05	
Valmeyer, Ill.	2.00‡	2.00‡	2.00‡	1.80‡	1.80‡	1.80‡
Waukesha, Wis.	1.10	1.20	1.35	1.35	1.20	1.20
Youngstown, Ohio	1.10	1.10	1.10	1.10	1.10	1.10
SOUTHERN:				1.50	1.60	1.60
Alderson, W. Va.	.60	1.60	1.60	1.50	1.40	
Bridgeport, Texas	1.50	1.35	1.25	1.25	1.20	1.15
Cartersville, Ga.	1.50	1.65	1.65	1.35	1.35	1.35
El Paso, Texas	1.00	1.00	1.00	1.00	1.00	
Ft. Springs, W. Va.	.60	1.60	1.60	1.50	1.40	
Graystone, Ala.	Crusher run screened, 1.00 per net ton					
Graysville, Ga.	1.00@1.25	1.00@1.25	.85@1.25	.85@1.25		
WESTERN:						
Atchison, Kans.	.50	2.00	2.00	2.00	2.00	1.60‖@1.80
Blue Spr'gs & Wymore, Neb.	.20	1.45	1.45	1.35@1.40	1.25@1.30	1.20
Cape Girardeau, Mo.	1.25		1.25	1.25	1.00	
Kansas City, Mo.	1.00	1.65	1.65	1.65	1.65	1.65

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Branford, Conn.	.60	1.60	1.35	1.15	1.00	
Cypress, Ill.	1.00@1.10					
Duluth, Minn.	1.00	2.25	1.75	1.50	1.30	1.30
Dwight, Calif.	1.75	1.75	1.75	1.75	1.75	
Eastern Maryland	1.10	1.75	1.70	1.60	1.50	1.50
Eastern Massachusetts	.85	1.75	1.75	1.25	1.25	1.25
Eastern New York	.75	1.25	1.25	1.25	1.25	1.25
Eastern Pennsylvania	1.10	1.75	1.70	1.60	1.50	1.50
Minneapolis, Minn.	1.25		2.25	2.00	1.75	
New Haven, Conn.	.60	1.60@1.75	1.35@1.50	1.15@1.30	1.00@1.10	
Northern New Jersey	1.40@1.50	1.40@2.00	1.80	1.40	1.40	
Oakland and El Cerrito, Calif.	1.75	1.75	1.75	1.75	1.75	
San Diego, Calif.	.50@ .75	1.80@1.90	1.60@1.80	1.35@1.55	1.35@1.55	1.25@1.45
Springfield, N. J.	2.00	2.10	2.10	1.70	1.60	1.60
Westfield, Mass.	.60	1.50	1.35	1.20	1.10	

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Berlin, Utley and Red Granite, Wis.	1.60	1.70	1.60	1.50	1.40	
Eastern Penn.—Sandstone	1.25	1.65	1.60	1.40	1.40	
Eastern Penn.—Quartzite	1.20	1.35	1.20	1.20	1.20	1.25
Lithonia, Ga.—Granite	.75		1.50	1.25	1.25	1.20
Lohrville, Wis.	1.65	1.65@1.70	1.65	1.45	1.50	
Middlebrook, Mo.—Granite	3.00@3.50		2.00@2.25	2.00@2.25	2.00@2.25	1.25@2.00
Northern New Jersey (Basalt)	150	2.00	1.80	1.40	1.40	
Richmond, Calif. (Basalt)	.75*		1.50*	1.50*	1.50*	

*Cubic yd. †1 in. and less. ‡Prices include 90c freight. ‖Rip rap per ton.

Agricultural Limestone
(Pulverized)

Alton, Ill.—Analysis, 98% $CaCO_3$; 90% thru 100 mesh	6.50
Asheville, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk	2.75
Branchton, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers)	5.00
Bridgeport and Chico, Texas; bulk	5.50
Cartersville, Ga.—Analysis, 56% $CaCO_3$, 42% $MgCO_3$; pulverized	2.25
100% thru 10 mesh	1.50
Chaumont, N. Y.—Pulverized limestone, bags, 4.00; bulk	2.50
Colton, Calif.—Analysis, 95% $CaCO_3$, 3% $MgCO_3$—all thru 20 mesh—bulk	4.00
Dundas, Ont., Can.—Analysis, 53.80% $CaCO_3$, 43.31% $MgCO_3$; 35% thru 100 mesh, 50% thru 50 mesh, 100% thru 10 mesh; bags, 4.75; bulk	3.00
Hillsville, Penn.—Analysis, 94% $CaCO_3$, 1.40% $MgCO_3$, 75% thru 100 mesh; sacks, $5.00; bulk	3.50
Jamesville, N. Y.—Analysis, 89.25% $CaCO_3$; 5.25% $MgCO_3$; pulverized, bags, 4.00; bulk	2.50
Knoxville, Tenn.—80% thru 100 mesh, bags, 3.95; bulk	2.70
Linville Falls, N. C.—Analysis, 57% $CaCO_3$, 39% $MgCO_3$; 50% thru 100 mesh; 200-lb. burlap bag, 4.00; bulk	2.75
Marblehead, Ohio—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 60% thru 100 mesh; 70% thru 50 mesh; 100% thru 10 mesh; 80 lb. paper sacks, 5.00; bulk	3.50
Marion, Va.—Analysis, 90% $CaCO_3$, 2% $MgCO_3$; 42.5% thru 100 mesh, 11.3% thru 80, 20.2% thru 60, 22.8% thru 40, 3.2% thru 20 and under or 75% thru 40 mesh; pulverized, per ton	2.00
Mayville Wis.—59.8% thru 60 mesh	2.35
Mountville, Va.—Analysis 76.60% $CaCO_3$, 22.83% $MgCO_3$; 50% thru 100 mesh, 100% thru 20 mesh—125-lb. hemp bags	5.00
Osborne, Penn.—100% thru 20 mesh; 60% thru 100 mesh; 45% thru 200 mesh. (Less 50 cents commission to dealers)	5.00
Piqua, Ohio—Total neutralizing power 95.3%; 100% thru 10, 60% thru 50; 50% thru 100	2.10@ 2.25
100% thru 10, 90% thru 50, 80% thru 100; bags, 5.00; bulk	3.50
100% thru 100, 85% thru 200; bags, 7.00; bulk	5.50
Rockdale, Mass.—Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk	3.25
Watertown, N. Y.—Analysis, 96-98% $CaCO_3$, pulverized limestone, bags, 4.00; bulk	2.00
West Stockbridge, Mass.—Analysis, 90% $CaCO_3$—50% thru 100 mesh; paper bags, 4.75; cloth, 5.25; bulk	3.25

Agricultural Limestone
(Crushed)

Alderson, W. Va.—Analysis, 90% $CaCO_3$; 50% thru 100 mesh	1.50
Alton, Ill.—Analysis 98% $CACO_3$; 50% thru 4 mesh	3.50
Bedford, Ind.—Analysis, 98½% $CACO_3$, ½% $MgCO_3$; 90% thru 10 mesh	1.50
Bettendorf, Iowa—97% $CaCO_3$, 2% $MgCO_3$; 50% thru 100 mesh; 50% thru 4 mesh	1.50
Blackwater, Mo.—98% $CaCO_3$; 100% thru 8 mesh	1.00
Bridgeport, Texas—Analysis, 94% $CaCO_3$, 2% $MgCO_3$; 50% thru 50 mesh; 90% thru 4 mesh. Fines one-half dust	1.50
Cape Girardeau, Mo.—Analysis, 93.5% $CaCO_3$, 3.5% $MgCO_3$; 90% thru 50 mesh	1.50

(Continued on next page)

Agricultural Limestone

(Continued from preceding page)

Chicago, Ill.—50% thru 100 mesh; 90% thru 4 mesh	.80
Cypress, Ill. — Analysis, 90 to 96% $CaCO_3$; 50% thru 100 mesh, 90% thru 50 mesh, 50% thru 50 mesh	1.90
Ft. Springs, W. Va.—Analysis, 90% $CaCO_3$; 90% thru 50 mesh	1.50
Kansas City, Mo.—50% thru 100 mesh	1.25
Lannon, Wis.—Analysis, 54% $CaCO_3$, 44% $MgCO_3$; 99% through 10 mesh; 46% through 60 mesh	2.00
Screenings (¼ in. to dust)	1.00
Marblehead, Ohio.—Analysis, 83.54% $CaCO_3$, 14.92% $MgCO_3$; 100% thru 4 mesh; 85% thru 10 mesh; 53% thru 50 mesh; 40% thru 100 mesh bulk	2.60
32% thru 100 mesh; 51% thru 50 mesh; 83% thru 10 mesh; 100% thru 4 mesh (meal) bulk	2.25
Middlepoint, Bellevue, Kenton, Ohio; Monroe, Mich.; Huntington and Bluffton, Ind. — Analysis, 52% $CaCO_3$, 44% $MgCO_3$; meal, 100% thru 4 mesh, 35% thru 100 mesh	.75@ 1.50
Milltown, Ind. — Analysis, 94.41% $CACO_3$, 2.95% $MgCO_3$; 30.8% thru 100 mesh .38% thru 50 mesh	1.45@ 1.60
Moline, Ill.—97% $CaCO_3$, 2% $MgCO_3$ —50% thru 100 mesh; 50% thru 4 mesh	1.50
Pixley, Mo.—Analysis, 96% $CACO_3$; 50% thru 50 mesh	1.25
50% thru 100 mesh; 90% thru 50 mesh; 50% thru 50 mesh; 90% thru 4 mesh; 50% thru 4 mesh	1.65
River Rouge, Mich.—Analysis, 54% $CaCO_3$, 40% $MgCO_3$; bulk	.80@ 1.40
Stone City, Iowa. — Analysis, 98% $CaCO_3$; 50% thru 50 mesh	.75

Pulverized Limestone for Coal Operators

Hillsville, Penn., sacks, 4.50; bulk	3.00

Miscellaneous Sands

Silica sand is quoted washed, dried and screened unless otherwise stated. Prices per ton.

Glass Sand:	
Berkeley Springs, W. Va.	2.25@ 2.50
Cedarville and S. Vineland, N. J.—Damp	1.75
Dry	2.25
Cheshire, Mass: 6.00 to 7.00 per ton; bbl.	2.50
Columbus, Ohio	1.25@ 1.50
Estill Springs and Sewanee, Tenn.	1.50
Grays Summit and Klondike, Mo.	2.00
Mapleton Depot, Penn.	2.00@ 2.25
Massillon, Ohio	3.00
Millville, N. J.—Green bottle sand	1.75@ 2.25
Ohlton, Ohio	2.50
Oceanside, Calif.	3.00@ 3.40
Pacific, Mo.	2.25@ 3.00
Pittsburgh, Penn.—Dry	4.00
Damp	3.00
Red Wing, Minn.: Bank run	1.50
Ridgway, Penn.	2.50
Rockwood, Mich.	2.75@ 3.25
Round Top, Md.	2.25
San Francisco, Calif.	3.00@ 3.50
St. Louis, Mo.	1.50@ 3.00
Thayers, Penn.	2.50
Utica, Ill.	1.00@ 1.25
Zanesville, Ohio	2.50
Miscellaneous Sands:	
Aetna, Ind.: Core, Box cars, net, .35; open-top cars	.30
Albany, N. Y.: Core	1.50
Molding fine, brass molding	2.25
Molding coarse	2.00
Sand blast	4.00
Arenzville, Ill.: Core	.75
Molding fine	1.40@ 1.60
Brass molding	1.75
Beach City, Ohio: Fine core, washed and screened	1.50
Furnace bottom: steel molding—(fine and coarse) washed and screened	2.00
Traction	1.75
Cheshire, Mass.—Furnace lining, molding fine and coarse	5.00
Sand blast	5.00@ 8.00
Stone sawing	6.00

(Continued on next page)

Wholesale Prices of Sand and Gravel

Prices given are per ton, f. o. b. producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel, ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
EASTERN:						
Ambridge & So. H'g'ts, Penn.	1.25	1.25	1.15	.85	.85	.85
Attica, N. Y.	.75	.75	.85	.75	.75	.75
Buffalo, N. Y.	1.10	.95			.85	
Erie, Penn.		1.00		1.25	1.50	
Farmingdale, N. J.	.58	.48	.85		1.10	
Franklinville, N. Y.	.75	.75	.85	.75	.75	.75
Leeds Jct., Maine		.50	1.75		1.35	1.25
Montoursville, Penn.	1.00	1.10	1.00	1.00	1.00	.90
Northern New Jersey	.40@ .50	.40@ .50		1.25	1.25	1.25
Pittsburgh. Penn., and vicinity		1.25	1.25	.85	.85	.85
Shining Point, Penn.			1.00	1.00	1.00	1.00
Washington, D. C.—Rewashed, river	.85	.85	1.70	1.50	1.30	1.30
CENTRAL:						
Attica, Ind.	.75	.75	.75	.75	.75	.75
Barton, Wis.		.22@ .40	.20@ .40	.20@ .40	.32@ .40	
Columbus, Ohio	.75	.75@1.00	.75@1.00	.75@1.00	.75@1.00	.75
Covington, Ind.	.75	.75	.75	.75	.75	.75
Des Moines, Iowa	.50	.30	1.50	1.50	1.50	1.50
Eau Claire, Wis.	.40	.40	.85@1.25			.85
Elkhart Lake, Wis.	.60	.50	.60	.60	.60	.60
Ft. Dodge, Iowa	1.00		2.05	2.05	2.05	
Ft. Worth, Texas	2.00	2.00	2.00	2.00	2.00	2.00
Grand Rapids, Mich.		.50		.80	.70	.70
Hamilton, Ohio		1.00	1.00§		1.00	
Hersey, Mich.		.50				.70
Indianapolis, Ind.	.60	.60		.90	.75@1.00	.75@1.00
Janesville, Wis.		.65@ .75			.65@ .75	
Mason City, Iowa	.45@ .55	.45@ .55	1.35@1.45	1.45@1.55	1.40@1.50	1.35@1.45
Mankato, Minn.		.50	1.35	1.35	1.35	
Milwaukee, Wis.	1.01	1.01	1.21	1.21	1.21	1.21
Minneapolis, Minn.*	.65	2.50†	2.00§		2.00	1.75
Moline, Ill.	.60	.60	1.20	1.20	1.20	1.20
Palestine, Ill.	.75	.75	.75	.75	.75	.75
St. Louis, Mo., f. o. b. cars	1.18	1.45	1.65§	1.45		1.45‖
Silverwood, Ind.	.75	.75	.75	.75	.75	.75
Summit Grove, Ind.	.75	.75	.75	.75	.75	.75
Terre Haute, Ind.	.75	.60	.90	.90	.90	.85
Wolcottville, Ind.	.75	.75	.75	.75	.75	.75
Waukesha, Wis.	.55	.55	.75	.75	.75	.75
Winona, Minn.	.40	.40	1.25	1.10	1.00	1.00
Yorkville, Sheridan, Oregon, Moronts, Ill.			Average .40@.60			
Zanesville, Ohio	.70	.60	.60		.90	
SOUTHERN:						
Brookhaven, Miss., Roseland La.	.70	.70	2.25	1.50	1.25	
Charleston, W. Va.	all sand 1.37 f.o.b. cars		all gravel 1.47 f.o.b. cars			
Chehaw, Ala.	1.24	1.24		1.90	1.90	1.90
Estill Sp'gs & Sewanee, Tenn.	1.00	.90	1.00	1.00		.85
Knoxville, Tenn.	1.00	1.00	1.20	1.20	1.20	1.20
Macon, Ga.	.50	.50		.65	.65	.65
New Martinsville, W. Va.	1.00	.90		1.30		.90
WESTERN:						
Baldwin Park, Calif.		.25@ .35			.50@ .75	
Crushed rock	.90@1.10	.60@ .90	.60@ .90	.60@ .90	.60@ .90	
Kansas City, Mo.	Kaw river sand .75 per ton f.o.b. plants					
Los Angeles, Calif.		.40	.50	.65	.60	.60
Pueblo, Colo.	1.10	.90*		1.50*		1.65*
San Diego, Calif.	50@ .65	.80@ .90	1.40@1.50	1.20@1.30	1.00@1.10	1.00@1.10
Seattle, Wash. (bunkers)	1.50*	1.50*	1.50*		1.50*	1.50*

Bank Run Sand and Gravel

City or shipping point	Fine Sand, 1/10 in. down	Sand, ¼ in. and less	Gravel ½ in. and less	Gravel, 1 in. and less	Gravel, 1½ in. and less	Gravel, 2 in. and less
Boonville, N. Y.	.60@ .80		.55@ .75			1.00
Brookhaven, Miss., Rosel'd, La.	Road gravel, ballast gravel .60 a ton					
Chehaw, Ala.	.90@1.00					
Des Moines, Iowa	Washed, .50; unwashed, .40 (not screened)					
Dudley, Ky.‡	1.05	1.05		.95		
East Hartford, Conn.	Sand, .65 per cu. yd.					
Elkhart Lake, Wis.	.50					
Gainesville, Texas		.95				.55
Grand Rapids, Mich.				.55		
Hamilton, Ohio					.67	
Hersey, Mich.				.55		
Indianapolis, Ind.	Mixed gravel for concrete work, .65					
Lindsay, Texas				.55		
Macon, Ga.	.40					
Mankato, Minn.	Pit run gravel, .60					
Moline, Ill. (b)	.60	.60	Concrete gravel, 50% G., 50% S., 1.00			
Montezuma, Ind.						.60
St. Louis, Mo.	Mine run gravel 1.55 per ton					
Shining Point, Penn.	Concrete sand, 1.10 ton					
Summit Grove, Ind.	.50	.50	.50	.50	.50	.50
Waukesha, Wis.	.60	.60	.60	.60	.60	.60
Winona, Minn.				.60	.60	.60
York, Penn.	1.10	1.00				
Zanesville, Ohio		.60				

*Cubic yd.; †roofing gravel; §⅝ in. and less; ‡crushed silica; ‖2½ in. and less; (a) ¾ in. and less; (b) river run.

Miscellaneous Sands

(Continued from preceding page)

Columbus, Ohio:		
Core	.25@	.30
Furnace lining		2.50
Molding fine		2.00
Molding coarse	1.50@	2.00
Sand blast	3.00@	4.00
Stone sawing		1.50
Traction	.30@	.65
Brass molding	2.00@	2.50
Dresden, Ohio:		
Core	1.25@	1.50
Molding fine	1.50@	1.75
Molding coarse		1.50
Traction		1.25
Brass molding		1.75
Dunbar, Penn.:		
Traction (damp)		2.00
Eau Claire, Wis.:		
Sand blast	3.00@	3.25
Elco, Ill.:		
Ground silica per ton in carloads	20.00@	31.00
Estill Springs and Sewanee, Tenn:		
Molding fine and coarse, brass molding		1.25
Roofing sand, sand blast, traction		1.50
Franklin, Penn.:		
Core		2.00
Molding coarse and fine		1.75
Grays Summit, Mo.:		
Molding fine	1.75@	2.00
Joliet, Ill.:		
No. 2 molding sand; also loam for luting purposes and open-hearth work	.65@	.85
Klondike, Mo.:		
Molding fine	1.75@	2.00
Manleton Depot, Penn.:		
Molding fine and coarse		2.00
Massillon, Ohio:		
Molding fine, coarse, furnace lining core and traction		2.50
Montoursville, Penn.:		
Core	1.25@	1.35
Traction	1.00@	1.10
Brass molding		1.50
New Lexington, Ohio:		
Molding fine		2.00
Molding coarse		1.50
Ohlton, Ohio:		
Core, furnace lining, molding fine and coarse, all green	1.75@	1.90
Roofing sand, sand blast, stone sawing, traction, all green		1.75
Add 50c a ton for green sand dried.		
Oceanside, Calif.:		
Roofing sand (stucco)	3.00@	3.40
Ottawa, Ill.:		
Crude silica sand	.75@	.85
Pacific, Mo.:		
Core, furnace lining	1.00@	1.25
Molding fine	.90@	1.00
Stone sawing	1.00@	1.75
Molding coarse	.85@	1.00
Red Wing, Minn.:		
Core, furnace lining, stone sawing		1.50
Molding fine and coarse, traction		1.25
Sand blast		3.50
Filter sand		3.75
Ridgway, Penn.:		
Core		2.00
Furnace lining, molding fine, molding coarse		1.25
Traction		2.25
Round Top, Md.:		
Core		1.60
Traction		1.75
Roofing sand		2.25
St. Louis, Mo.:		
Core	1.00@	1.75
Furnace lining		1.50
Molding fine	1.50@	2.50
Molding coarse	1.25@	1.75

Crushed Slag

City or shipping point	Roofing	¼ in. down	½ in. and less	¾ in. and less	1½ in. and less	2½ in. and less	3 in. and larger
EASTERN:							
Buffalo, N. Y.	2.25	1.25	1.25	1.25	1.25	1.25	1.25
E. Canaan, Conn.	3.00	1.00	2.25	1.25	1.25	1.15	1.15
Eastern Penn. and Northern N. J.	2.50	1.20	1.50	1.20	1.20	1.20	1.20
Reading, Pa.	2.50	1.00	2.50*	1.25	.....	.....	.....
Western Penn.	2.50	1.25	1.50	1.25	1.25	1.25	1.25
CENTRAL:							
Ironton, Ohio	2.05	1.05	.....	1.45	.....	1.45	.....
Jackson, Ohio	.....	1.05	.....	1.30	1.05	1.30	.....
Toledo, Ohio	1.50	1.25	1.25	1.25	1.25	1.25	1.25
Youngstown, Dover, Hubbard, Leetonia, Struthers, O.	2.00	1.25	1.35	1.35	1.25	1.25	1.25
SOUTHERN:							
Ashland, Ky.	.....	1.55	.....	1.55	1.55	1.55	.....
Ensley and Alabama City, Ala.	2.05	.80	1.25	1.15	.90	.90	.80
Longdale, Goshen, Glen Wilton, Roanoke, Ruesens, Va.	2.54	1.00	1.25	1.25	1.25	1.15	1.15

*Clean.

Lime Products (Carload Prices Per Ton F.O.B. Shipping Point)

	Finishing hydrate	Masons' hydrate	Agricultural hydrate	Chemical hydrate	Ground burnt lime, Blk.	Ground burnt lime, Bags	Lump lime, Blk.	Lump lime, Bbl.
EASTERN:								
Berkeley, R. I.	.....	.....	12.00	.....	.....	.....	.....	2.30
Buffalo, N. Y.	.....	.....	.....	12.00	.....	.....	.....	.....
Lime Ridge, Penn.	.....	.....	.....	.....	.....	.....	5.00a	.....
West Stockbridge, Mass.	.....	10.50	6.00l	.....	.....	.....	.....	3.25m
Williamsport, Penn.	.....	.....	10.00	.....	.....	.....	6.00	.....
York, Penn.	.....	10.50	10.50	11.50	.....	.....	8.50	1.65i
CENTRAL:								
Cold Springs, Ohio	.....	9.00	9.00	.....	9.00	11.00	9.00	.....
Delaware, Ohio	12.50	9.00	8.00	10.00	.....	.....	9.00	1.60
Gibsonburg, Ohio	12.50	.....	.....	.....	9.00	11.00	.....	.....
Huntington, Ind.	12.50	9.50	9.50	.....	9.00	.....	8.50	1.50c
Luckey, Ohio (f)	12.50	.....	.....	.....	.....	.....	.....	.....
Marblehead, Ohio	.....	9.50	9.50	.....	.....	.....	8.50	1.50c
Marion, Ohio	.....	9.50	9.50	.....	.....	.....	8.50	1.70j
Mitchell, Ind.	.....	12.00	12.00	12.00	11.00	.....	10.00	1.70e
Tiffin, Ohio	.....	.....	.....	.....	9.00	.....	.....	.....
White Rock, Ohio	12.50	.....	.....	.....	9.00	11.00	.....	.....
Woodville, Ohio	12.50†	9.00†	8.50†	.....	9.00	10.50	8.00	1.60
SOUTHERN:								
Erin, Tenn.	.....	.....	.....	.....	.....	.....	8.50	1.40*
El Paso, Texas	.....	.....	.....	.....	.....	.....	9.00	.....
Graystone, Ala.	12.50	11.00	.....	8.50@10.00	.....	.....	8.50	1.50k
Karo, Va.	.....	10.50	9.00	.....	.....	.....	7.00g	1.65h
Knoxville, Tenn.	12.50	11.00	.....	11.00	.....	1.35	8.50	1.50
Staunton, Va. (boss lime)	.....	.....	.....	.....	.....	.....	.....	1.30
Varnons, Ala. (f)	11.00	11.00	.....	.....	9.50	.....	8.50	15.00
Zuber and Ocala, Fla.	14.00	12.00	10.00	.....	.....	.....	12.00	1.70
WESTERN:								
Kirtland, N. M.	.....	.....	.....	.....	.....	.....	15.00	.....
San Francisco, Calif.	22.00	22.00	15.00	22.00	.....	.....	2.00n	.....
Tehachapi, Calif.	.....	.....	.....	.....	.....	.....	13.00	2.00d

*And 1.50; †50-lb. paper bags; (a) run of kilns; (c) wooden, steel 1.70; (d) wood; (e) wood bbl., $2.20 drum in steel; (f) dealers' prices; (g) to 9.50; (h) to 1.75; (i) 200 lb. bbl.; 2.65, 300 lb. bbl.; (j) steel; (k) 180 lb. bbl., 1.35; (l) bags; (m) finishing lime, 2.50 common; (n) low grade; 2.50, high calcium.

Miscellaneous Sands

(Continued)

Roofing sand		1.75
Sand blast	3.50@	4.50
Stone sawing	1.25@	2.25
Traction		1.25
Brass molding	2.00@	3.00
San Francisco, Calif.:		
(Washed and dried)—Core, molding fine, roofing sand and brass molding	3.00@	3.50
San Francisco, Calif. (Direct from Pit)		
Furnace lining, molding coarse, sand blast		3.60
Stone sawing, traction		2.30
Tamalco, Ill.:		
Molding coarse	1.40@	1.60
Brass molding		1.75
Tamms, Ill.:		
Ground silica per ton in carloads	20.00@	31.00
Thayers, Penn.:		
Core		2.00
Molding fine and coarse		1.25
Traction		2.25
Utica, Ill.:		
Core, furnace lining, molding fine and coarse (crude and dried)	.60@	1.25
Roofing sand, stone sawing, brass molding	1.00@	1.25
Sand blast		2.25
Traction		1.00
Utica, Penn.:		
Core, molding fine, brass molding		2.00
Molding coarse	1.50@	1.75
Warwick, Ohio.:		
Core, molding coarse (green) 1.75; (dry) 2.50; traction		2.50
Zanesville, Ohio:		
Sand blast, core, traction		2.50
Furnace lining		2.25
Molding fine and coarse; brass molding	1.50@	1.75

Talc

Prices given are per ton f.o.b. (in carload lots only), producing plant, or nearest shipping point.

Chatsworth, Ga.:		
Crude—f.o.b. cars		4.50
Ground (150-200 mesh), bags		12.00
Pencils and steel workers' crayons, per gross		1.50
Chester, Vt.:		
Ground (20-70 mesh)	7.00@	8.00
Ground (150-200 mesh)	8.00@	10.00
(Bags extra, returnable)		
E. Granville, Rochester, Johnson, Waterbury, Vt.:		
Ground talc (20-50 mesh) bags	7.00@	10.00
Ground talc (150-200 mesh) bags	10.00@	25.00
Pencils and steel workers' crayons, per gross	.75@	2.00
Emeryville, N. Y.:		
(Double air floated) including bags; 325 mesh, C.L., 14.75; L.C.L.		15.25
Hailesboro, N. Y.:		
Ground (150-200 mesh) bags		18.00
Henry, Va.:		
Crude talc (mine run) per 2000-lb. ton	2.75@	3.50
Ground (150-200 mesh), bags	8.50@	14.00
Joliet, Ill.		
Ground (200 mesh) bags	30.00@	35.00
Keeler, Calif.:		
(150-200 mesh); carloads, 30 tons or more (bags extra)	20.00@	30.00
Marshall, N. C.:		
Crude	4.00@	8.00
Ground (20-50 mesh), bags extra	6.50@	8.50
Ground (150-200 mesh), bags	8.00@	12.00
Natural Bridge, N. Y.:		
Ground talc (300-325 mesh), 200-lb. bags	13.00@	15.00

Rock Phosphate

Prices given are per ton (2240-lb.) f.o.b. producing plant or nearest shipping point.

Lump Rock

Centerville, Tenn.—B.P.L. 65%, bags		8.50
Bulk		6.50
Gordonsburg, Tenn.—B.P.L. 68-72%..	4.00@	4.50
Mt. Pleasant, Tenn.—B.P.L. 72%	5.50@	6.00
13% phosphoric acid, 95% thru 80 mesh		5.75
75% hand mined	6.50@	6.75
75% (free of fines for furnace use)		6.75
75% max. 5½% I and A	6.50@	7.00
78% max. 4½% I and A		8.00
Tennessee—F. O. B. mines, gross ton, unground Tenn. brown rock, 72% min. B.P.L.		5.50
Twomey, Tenn.—B.P.L. 65%, 2000 lb.	7.00@	8.00

Ground Rock

(2000 lb.)

Mt. Pleasant, Tenn. — B.P.L. 65% 95% thru 100 mesh		7.00
Twomey, Tenn.—B.P.L. 65%	7.00@	8.00

(Continued on next page)

Roofing Slate

The following prices are per square (100 sq. ft.) for Pennsylvania Blue-Clay Roofing Slate, f. o. b. cars quarries:

Sizes	Genuine Bangor, Washington Big Bed, Franklin Big Bed	Genuine Albion	Slatington Small Bed	Genuine Bangor Ribbon
24x12, 24x14	10.20	10.00	8.10	7.80
22x12	10.80	10.00	8.40	8.75
22x11	10.80	10.50	8.40	8.75
20x12	12.60	10.50	8.70	8.75
20x10, 18x10, 18x9, 18x12	12.60	11.00	8.70	8.75
16x10, 16x9, 16x8, 16x12	12.60	11.00	8.40	8.75
14x10	11.10	11.00	8.10	7.80
14x8	11.10	10.50	8.10	7.80
14x7 to 12x6	9.30	10.50	7.50	7.80
	Mediums	Mediums	Mediums	Mediums
24x12	$ 8.10	$8.10	$7.20	$5.75
22x11	8.40	8.40	7.50	5.75
Other sizes	8.70	8.70	7.80	5.75

For less than carload lots of 20 squares or under, 10% additional charge will be made.

(Continued from preceding page)

Florida Soft Phosphate

(Raw Land Pebble)

Per Ton

Florida—F. O. B. mines, gross ton, 68/66% B.P.L., Basis 68%	2.25
70% min. B.P.L., Basis 70%	2.50
72% min. B.P.L., Basis 72%	2.75
75/74% B.P.L., Basis 75%	3.75

Fluorspar

Fluorspar—80% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	18.00
Fluorspar—85% and over calcium fluoride, not over 5% silica; per ton f.o.b. Illinois and Kentucky mines	19.50

Special Aggregates

Prices are per ton f. o. b. quarry or nearest shipping point.

City or shipping point	Terrazzo	Stucco chips
Barton, Wis., f.o.b. cars		10.50
Chicago, Ill.—Stucco chips, in sacks f.o.b. quarries		17.50
Crown Point, N. Y.—Mica Spar	7.00@ 8.00	
Easton, Penn.—Evergreen, grit (bulk)		2.00
Royal grit (bulk)		3.00
Haddam, Conn.—Felstone buff	12.00	12.00
Harrisonburg, Va.—Blk marble (crushed, in bags	12.50	12.50
Ingomar, Ohio (in bags)		6.00@20.00
Middlebrook, Mo.—Red		20.00@25.00
Milwaukee, Wis.		14.00@34.00
Newark, N. J.—Roofing granules		7.50
New York, N. Y.—Red and yellow Verona		32.00
Poultney, Vt., 2000 lb.		6.12
Phillipsburg, N. J.—Evergreen, bulk	8.00@10.00	8.00@10.00
Creme and royal, bulk	15.00@20.00	15.00@20.00
Red Granite, Wis.		7.50
Sioux Falls, S. D.	7.50	7.50
Stockton, Cal.—Sized rock for roofing and stucco dashes, CL lots		10.00
Tuckahoe, N. Y.—2000 lb.		8.00@12.00
Wauwatosa, Wis.		16.00@45.00
Whitestone, Ga.—White marble chips, net ton in bulk, f.o.b. cars, granite	4.50@ 6.00	4.50@ 6.00

Concrete Brick

Prices given per 1000 brick, f.o.b. plant or nearest shipping point.

	Common	Face
Appleton, Minn.	22.00	
Baltimore, Md. (Del. according to quantity)	16.00@17.00	22.00@50.00
Ensley, Ala. ("Slagtex")	12.50	22.50@33.50
Eugene, Ore.	25.00	35.00@75.00
Friesland, Wis.	22.00	32.00
Milwaukee, Wis.	14.00@15.00	33.00@75.00
Omaha, Neb.	18.00	30.00@40.00
Philadelphia, Penn.	15.00	21.00
Prairie du Chien, Wis.	14.00	22.00@30.00
Puyallup, Wash.	20.00	30.00@90.00
Rapid City, S. D.	18.00	25.00@45.00
Watertown, N. Y.	21.00	35.00
Wauwatosa, Wis.	14.00@18.00	30.00@42.00

Sand-Lime Brick

Prices given per 1000 brick f. o. b. plant or nearest shipping point, unless otherwise noted.

Barton, Wis.	10.00
Boston, Mass.	14.00@15.50
Dayton, Ohio	12.50@13.50
Grand Rapids, Mich. (wholesale)	10.00
Jackson, Mich.	13.00
Lancaster, N. Y.	13.50
Michigan City, Ind.	11.00
Milwaukee, Wis.	13.00
Plant City, Fla.	10.00@11.00
Portage, Wis.	15.00
Rochester, N. Y. (delivered)	19.75
Saginaw, Mich.	13.00
San Antonio, Texas	12.50@14.00
Syracuse, N. Y.	18.00

Gray Klinker Brick

El Paso, Texas	13.00

Lime

Warehouse prices, carload lots at principal cities.

	Hydrated, Finishing	per ton Common
Atlanta, Ga.	22.50	14.00
Baltimore, Md.	24.25	17.85
Boston, Mass.	20.50	15.50
Cincinnati, Ohio	16.80	14.30
Chicago, Ill.	20.00	18.00
Dallas, Tex.	20.00	
Denver, Colo.	24.00	
Detroit, Mich.	22.00	20.00
Minneapolis, Minn. (white)	25.50	21.00
Montreal, Que.		21.00
New York, N. Y.	18.20	13.10
Philadelphia, Penn.	23.00	16.00
St. Louis, Mo.	24.00	20.00
San Francisco, Calif.	22.60	
Seattle, Wash. (paper sacks)	24.00	

Portland Cement

Prices per bag and per bbl. without bags net in carload lots.

	Per Bag	Per Bbl.
Albany, N. Y.		2.62
Atlanta, Ga.		2.35
Boston, Mass.		2.63@3.03†
Buffalo, N. Y.		2.48@2.88†
Cedar Rapids, Iowa	.61	2.44
Cincinnati, Ohio	.61¼	2.47
Cleveland, Ohio	.59¼	2.39
Chicago, Ill.	.55	2.20
Columbus, Ohio		2.44
Dallas, Texas	.53¼	2.15
Davenport, Iowa	.59¼	2.39
Dayton, Ohio		2.48
Denver, Colo.	.63¼	2.55
Detroit, Mich.	.60	2.40
Duluth, Minn.	.54¼	2.19
Indianapolis, Ind.	.60¼	2.41
Kansas City, Mo.	.54¼	2.47
Los Angeles, Cal. (less 5c dis.)	.65	2.98
Memphis, Tenn.		2.60
Milwaukee, Wis.	.58¼	2.35
Minneapolis, Minn.	.60½	2.42
Montreal, Canada (sks. 20c ext.)		1.90b
New Orleans, La.		2.40
New York, N. Y.		2.25@2.65†
Philadelphia, Penn.		2.41@2.81†
Phoenix, Ariz.	.82½	3.30
Pittsburgh, Penn.	.54¼	2.19
Portland, Ore.		3.05
San Francisco, Cal.		2.61*
St. Louis, Mo.	.57½	2.30
St. Paul, Minn.	.60½	2.42
Seattle, Wash. (10c bbl. dis.)		2.65
Toledo, Ohio	.61¼	2.45

NOTE—Add 40c per bbl. for bags.
*5c cash disc. 10 days.
†Prices to contractors, including bags.
(b) Less 10c 20 days.

Mill prices f.o.b. in carload lots, without bags, to contractors.

	Per Bag	Per Bbl.
Buffington, Ind.	.48¾	1.95
Concrete, Wash.		2.60
Dallas, Texas		2.15
Fordwick, Va.		2.05
Hannibal, Mo.		2.05
Hudson, N. Y.		2.05
Kingsport, Tenn.		2.05
Leeds, Ala.		1.95
Louisville, Ky.		2.45
Northampton, Penn.		1.95
Steelton, Minn.	.50	2.00
Universal, Penn.	.48¾	1.95

Cement Products

Hawthorne tile, carload lots, f. o. b. plant.

	Cicero, Ill. Per sq.	Ft. Worth, Tex. Per sq.
Silver gray		9.00
Red French	9.00	9.00
Green French	11.00	10.00
Red Spanish	12.00	9.00
Green Spanish	14.00	10.00

	—Cicero— Red	Green	—Ft. Worth— Gray	Red	Green
Ridges	.25	.35	.25	.25	.30
Hips	.20	.30	.14	.14	.17
Ridge closers	.05	.06	.06	.06	.06
Hip terminals, 2 way	1.25	1.50	1.00*	1.00*	1.25*
Hip starters	.50	.60	.22	.22	.25
Gable finials	1.25	1.50	1.00	1.00	1.25
Gable starters	.20	.30	.14	.14	.16
End bands	.20	.30	....	....	....
Eave closers	.06	.08	.06	.06	.06

*3-way terminals.

Gypsum Products—CARLOAD PRICES PER TON AND PER M SQUARE FEET, F. O. B. MILL

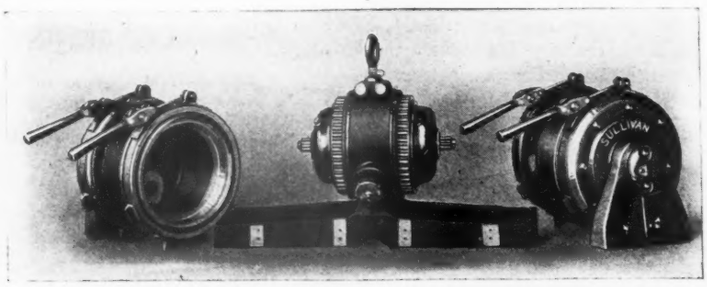
	Crushed Rock	Ground Gypsum	Agricultural Gypsum	Stucco Calcined Gypsum	Cement and Gauging Plaster	Wood Fiber	White Gauging	Sanded Plaster	Keene's Cement	Trowel Finish	—Plaster Board— ¼x32x36" Weight 1500 lb. Per M Sq. Ft.	⅜x32x36" Weight 1850 lb. Per M Sq. Ft.	Wallboard, ⅜x32 or 48" Lengths 6'-10', 1850 lb. Per M Sq. Ft.
Agatite, Texas (a)	.....	.....	6.00	10.00	10.00	10.50	10.00	.....	19.00	.....	.....	.....	.....
Akron, N. Y. (a)	3.00	4.00	6.00	10.00	10.00	10.00	20.20	7.00@9.00	27.35	21.00	19.375	20.00	30.00@32.00
Blue Rapids, Kans. (a)	2.50	4.00	6.00	10.00	10.00	10.50	10.00	.....	23.15	19.00	19.375	20.00	.....
Denver, Colo.	.....	.....	.....	11.80	.....	.....	.....	.....	.....	.....	.....	.....	.....
Douglas, Ariz.	.....	.....	7.00	.....	16.50	.....	19.50	.....	.....	15.50	.....	.....	.....
Ft. Dodge, Iowa (a)	2.50	4.00	6.00	10.00	10.00	10.50	15.45	.....	22.70	20.00	19.375	20.00	30.00
Grand Rapids, Mich.	2.75*	6.00†	6.00†	9.00‡	10.00‖	10.00‖	.....	.....	.....	.....	.....	.....	.....
Gypsum, Ohio (a)	2.75	4.00	6.00	10.00	10.00	10.00	19.25	7.50	26.85	19.00	19.375	20.00	30.00
Port Clinton, Ohio	3.00	4.00	6.00	8.00	9.00	9.00	.....	7.00	.....	.....	.....	20.00	30.00
Portland, Colo.	.....	.....	.....	10.00	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Francisco, Calif.	.....	.....	10.15	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Winnipeg, Man.	5.50	5.50	7.00	13.50	15.00	15.00	.....	.....	.....	.....	28.50	.....	35 00

NOTE—Returnable Bags, 10c each; Paper Bags, 1.00 per ton extra (not returnable).
*To 3.25; †to 8.00; ‡to 11.00; ‖to 12; (a) prices are net of bags.

New Machinery and Equipment

New Sullivan Electric Portable Hoist

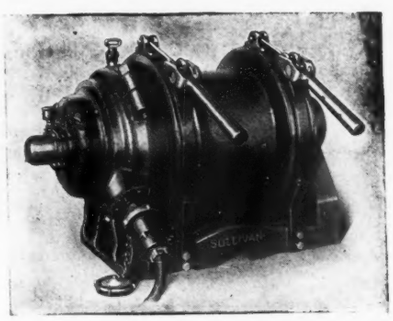
THE Sullivan single drum and double drum electric portable hoists have been designed to meet the demand for a small hoist when compressed air is not available, and are in successful use in different parts of the country. As shown by the accompanying illustrations, they are quite similar in appearance to the Sullivan compressed air hoist, known as the Turbinair.



Double-drum electric hoist, showing drums removed and location and mounting of motor

As in the case of the air hoist, the motor of the electric machine is contained entirely within the drum which makes for compactness, simplicity and ease of handling.

In the single drum hoist, the motor is supported at one end of the frame or base, and supplies power, through reduction gears, to the hoisting drum, which is 11⅛ in. in diameter by 8¼ in. long. This relatively large drum diameter reduces strain and wear on the hoisting rope, which is 5/16 in. wire cable. The drum holds 500 ft.



Single-drum electric portable hoist

The horsepower and rating of the hoists are similar to those of the compressed air machine, namely 6½ hp. with a capacity of 2000 lb. dead load lifted vertically, at a speed of 110 ft. per minute on single lines. When hauling cars, for example, on moderate grades or on the level, the pulling power is much greater.

For scraping or "slushing" work, the double drum Sullivan electric hoist has been in use for over a year with excellent satisfaction in the Lake Superior copper country, the manufacturer states.

This machine weighs 780 lb., is 38 in. long by 15 in. wide and stands 19 in. high.

In the double drum hoist the electric motor is mounted between the two drums on a central standard, carrying a pinion at each end of its armature shaft, thus furnishing power through reduction gears, to the two drums, each of which is 11⅛ in. in diameter by 6¼ in. in length, with a capacity of 250 each of 5/16 in. wire rope. The right hand or haulage drum has an operating speed at full load (2000 lb. vertical lift) of 110 ft. per minute. The gearing of the left hand or tail rope drum provides for 160 ft. per minute for handling the emtpy scraper or drag line.

The 6½ hp. Westinghouse motor, built especially for this hoist, draws about 25 amperes when running the hoist at full capacity. It is a compound wound motor with series winding and is totally enclosed so that dust and dirt are excluded at all times.

The operating parts of the hoists follow the experience of the designers in building the air machines. The reduction gears are of large dimensions, to withstand the severe duty required in portable hoist service. These gears are cut from alloy steel, are properly heat treated, and revolve on ball bearings. The internal mechanism of the drum also rotates on ball or roller bearings. Electric steel castings and drop forgings have been employed for almost all parts of these machines, thus permitting light weight without sacrifice of strength.

Speed Reducers Make the Brontosaurus to Live Again

AN extraordinary use of speed reducers was recently made by the Foote Bros. Gear and Machine Co., Chicago, Ill., when the company's engineers applied them to a large size model of the dinosaur Brontosaurus, one of the monsters that lived on this continent in the Jurassic period, perhaps 10,000,000 years ago.

This was not an advertising "stunt." The model was carefully made by Messmore & Damon, Inc., of New York for exhibition purposes and closely follows the lines of the restored Brontosaurus in the American Museum of Natural History, New York. It is 48 ft. 9 in. long and the frame work is made of rattan covered with springs. This frame is covered with a quilted fabric and the head and feet are of papier-mache.

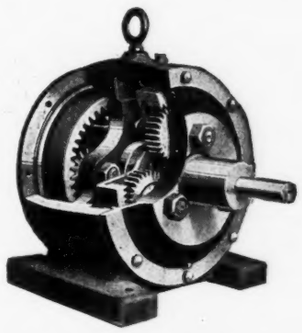
The neck has five different motions and the head three. When the head is raised it is 16 ft. above the ground. The tail has five motions and the stomach three and each leg has four different motions. The lifelikeness of the model is said to be too real to be pleasant.

All these motions are made by 10 motors with IXL speed reducers controlled from a single switchboard. Power is sent to the different parts through links of steel tubing.

Speed reducers make the Brontosaurus live again

The IXL speed reducer mentioned is a simple, self contained unit, consisting of trains of spur and internal gears. The power is delivered to a pinion at the high speed end, which revolves between three idler gears journaled to parts of the frame. These idlers drive a large internal gear. The slow speed pinion is keyed to the high speed internal gear and, in turn, drives

another set of idler gears. The two shafts revolve in the same direction and are concentric; direction of rotation may be reversed if desired. It is apparent that it is possible to secure with these units almost



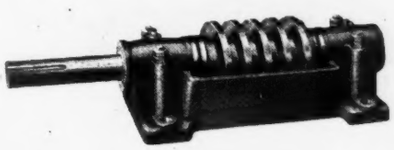
Internal mechanism of IXL spur-gear speed reducer

any reduction ratio by simply increasing the number of gear trains and varying the ratio of the pinions and gears.

The application of speed reducers to the motion producing mechanism of the Brontosaurus is an extraordinary one, but it serves to demonstrate the versatile adaptability and almost limitless uses found in modern industry for these simple, safe, compact speed reduction units.

Jones Double-Thrust Worm-Box

THE W. A. Jones Foundry and Machine Co., 4401 West Roosevelt road, Chicago, Ill., has placed on the market the double-thrust worm-box illustrated. The manufacturer claims that it provides an accurate and rigid support for the worm-shaft and holds a liberal supply of oil in which the worm operates. Finished thrust washers are provided at both ends of the worm, the two end



Double-thrust worm-box

ones of steel and the center one of hard fiber. The bearings are babbitted, bored and faced on ends. These boxes are made in standard sizes to suit standard cut steel worms as made by this company.

The manufacturer recommends that these boxes be used with open worm-gear drives when something less expensive than a completely enclosed unit is required.

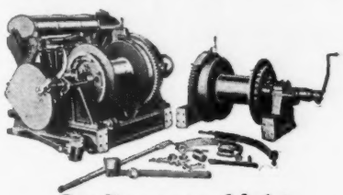
The New Flory Gasoline Hoist

THE S. Flory Manufacturing Co., Bangor, Penn., has placed on the market a new hoist which is powered with a gasoline motor. This, of course, gives it an initial advantage over steam hoists but there are other advantages which will commend it even more highly, especially to the operator who is producing a small output, and who does not wish to carry a large stock of expensive spare parts.

The hoist itself is of standard Flory make, all parts being built over templates and jigs so that they are perfectly interchangeable. The motor is a Fordson tractor motor for which parts can be obtained in even the smallest country towns, and with which almost every mechanic is familiar.

The engine operates on either gasoline or kerosene. At a speed of 1050 r.p.m. it develops 20 hp. and the rope pull is 4000 lb. The drums are interchangeable and a second drum can easily be added to a single drum unit. The weight of the hoist alone, single drum, is 3730 lb., and double drum, 5450 lb. The motor and accessories weigh 1150 lb.

The hoist drums are 12-in. diameter and 20 in. long between the flanges which are 8



Gasoline-powered hoist

in. high. Gears are of steel, machine cut. The frictions are the special Flory design, 26½-in. diameter and operated by the Flory friction nut. The brakes are 26½ in. diameter and and 3 in. wide, of the heavy differential band type.

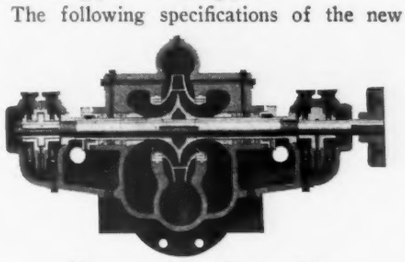
The speed with a 4000-lb. rope pull is 125 ft. per minute.

New Allis-Chalmers Centrifugal Pump

THE Allis-Chalmers Mfg. Co., Milwaukee, Wis., which has already been responsible for a number of improvements in centrifugal pumps, has produced a new pump similar to their well-known Type S. It is adapted especially to low heads and is even higher in efficiency than the Type S due to the elimination of hydraulic losses.

To illustrate the performance of this pump, characteristic curves of the new 5-in. pump are given. It will be noted that for 900 gal. against 68 ft. head an efficiency of 80% is obtained and that it is above 70% from 520 g.p.m. to 1120 g.p.m.

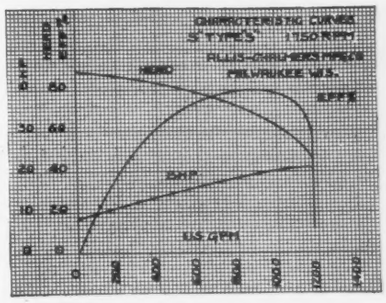
The following specifications of the new



Cross-section of new 5-in. centrifugal pump

pump have been furnished by the manufacturers:

Bronze Companion wearing rings. Wearing rings are L shaped to reduce disturbance in suction passages and increase efficiency.



Characteristic curves of new 5-in. pump

Split Bronze Enclosed Glands with drain to prevent water being thrown off or entering bearings.

Stuffing Box Throat provided with Bronze Bushings.

Annealed Steel shaft with removable Cast Bronze Sleeves extending from runner hub to inside of bearing housing.

Double acting center collar thrust bearing on outboard end firmly fixed and locked in place for all time, does not become loose.

Split bearing shells with two oil rings; oil is led to center of bearing keeping it away from the ends and affording a circulation.

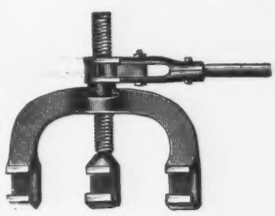
Self-closing oil hole covers, dust covers at ends, Gits oil level indicating cups on side of bearings.

Waterseal passages integral in upper half casing; can be arranged for outside seal when necessary.

Shaft Nuts designed to act as oil thrower to keep oil in bearings, and shaft sleeves designed to prevent any water which might creep along the shaft from entering the bearings.

New Rail Bender

A NEW double-acting ratchet-type rail bender for light rails, up to and inclusive of 50 lb. per yard steel rails, has been put on the market by the Engineering Products Co., Peoples Gas building, Chicago.



The manufacturers say that the bender is forged from best open-hearth steel and has steel screws, square threads, machine cut, three to an inch. It has a great advantage over their many other types of benders, as it can be used in crowded spaces, where a bender can only operate on one side of the rail.

The ratchet plates are made of malleable iron and the ratchet nut of forged steel. There is a recess cut in boss of bender to receive the ratchet nut.

The new bulletin issued by the Engineering Products Co. also covers other types of rail benders, rail and track drills, car and engine replacers, etc., and will be mailed by them to anyone interested.

News of All the Industry

Incorporations

Field Concrete Co., Portland, Ore., has been incorporated for $1000 by W. Field, Evelyn Field, and Eugene Brookings.

Universal Rock Asphalt Corp. has been incorporated under the laws of Delaware for $200,000. (Corporation Trust Co. of America.)

Gypsum Construction Corp., New York City, has been incorporated. (Attorney, F. C. Kronmeyer, 2 Wall street, New York City.)

Drew Gravel Co., Little Rock, Ark., has been incorporated for $10,000 by Ben Harvey Parnell, M. E. Sherland, and E. E. Williams.

Elk Mountain Sand and Gravel Co., Asheville, N. C., has been incorporated for $25,000 by E. L. Shufford, Jr., K. L. Jones, and B. H. Denehie, all of Asheville.

Borough Concrete Works, Brooklyn, N. Y., has been incorporated for $10,000 by H. Colter, M. Perlmutter, and R. L. Berkowitz. (Attorney, H. Helkin, 32 Court street, Brooklyn.)

Peerless Concrete Products Co., Inc., Chelmsford, Mass., has been incorporated for $50,000. John A. McAdams, president; Minot A. Bean, Chelmsford, treasurer; and James C. Warner.

Paramus Cement Products Co., 12-16 Lexington avenue, Passaic, N. J., has been incorporated by Bruno Lischke, 37 South Fifth street, Clifton, N. J.; Marcelle Diehl, Garfield; and Frank Trappe, Ridgewood.

Yeager Builders' Supply Co., Inc., Buffalo, N. Y., has been incorporated for $105,000 to manufacture cement and deal in building supplies. Incorporators: M. A. Yeager, 71 Shenandoah road, Buffalo.

H. E. Fletcher Co., Westford, Mass., has been incorporated for $100,000 to deal in stone, metals, and minerals. Incorporators: Herbert E., Harold H., and Ralph A. Fletcher, of Westford; and David Billson, of Chelmsford.

Pacific-Stone Tile Co., Inc., Pasadena, Calif., has been incorporated for $20,000. Directors: Joe H. Castleman, W. A. DeGarmo, and John B. Antrobus of Pasadena; and James M. Wilson and Edward H. Whitney of Altadena, Calif.

Diatomaceous Products Co. has been incorporated under the laws of Delaware for $300,000 to mine earth and clays. Incorporators: F. B. Matthews, La Platte, Md.; G. H. Stevenson, Bel Alton, Md.; and W. V. Howard, Washington, D. C. (Attorney, J. P. Lefever, Dover, Del.)

Sand and Gravel

Enwood Sand and Rock Co.'s $100,000 plant at Roseville, Calif., is now in operation.

Blue Diamond Co., Los Angeles, Calif., is putting in a 23x103-ft. sand-washing plant at 2200 East 16th street.

George Scofield Co., 1533 Dock street, Tacoma Wash., has succeeded to the sand, gravel and building material business of the Savage-Scofield Co.

Atlas Rock Co., Oakdale, Calif., shipped out 190 cars of gravel, sand and crushed rock last month, and the output is gradually increasing, according to reports which state that the daily output is now about 15 cars of finished material.

McCleery & Weston is the new name of the Eburne Gravel Co., Point Grey, B. C. There is no change in the personnel of the firm, which has been operating under the old name in Point Grey for many years, and is, in fact, the oldest firm of its kind in the district, it is stated. The company has a bunker plant on the North Arm at Marpole and handles sand, gravel, lime, brick, cement, crushed rock, etc., and all builders' supplies.

Central Sand and Gravel Co., of Indiana, has been sold, according to announcement made by D. C. Stephenson, to L. G. Julian, of Evansville, Ind., for $200,000. Mr. Stephenson has accepted a position as general manager of a New York firm at a salary of $25,000, it is said, and it is reported that he had caused to be written into the contract for the sale of the company a provision that the company could not sell its product to the state during the term of the next governor.

Quarries

General Stone Co., Amherst, Ohio, is reported to be developing a stone quarry in West Virginia.

Louis Jacquot, of Farmington, Wis., is reported as having plans to buy and operate a limestone quarry in the vicinity of Osceola if the farmers give him sufficient encouragement. It is said that the lime will cost $2.50 a ton.

J. Costello, rock and cement dealer, has opened offices in the Thomas building, San Leandro, Calif., where he operates a quarry. He recently completed the contract to furnish rock required in the construction of a $150,000 theater in that city.

Western Pennsylvania Syndicate is interested in property containing high calcium limestone in Bruin, Butler county, Penn., and has a small operation under way, with plans for a larger operation later. Kirby Thomas is the president, with offices at 25 Broadway, New York City.

F. E. Conley Stone Co., Utica, N. Y., has shipped more than 3000 cars of crushed stone and 1500 cars of ground limestone during the past season from its two quarries at Munnsville and Blakeslee. Installation of a new crusher at Munnsville, said to turn out 2000 tons of stone daily, has enabled the company to expedite deliveries.

Keystone Arsenic Co., Keystone, S. D., it is reported, has obtained options on a site on which there are large deposits of black granite and will open a quarry soon. W. O. Willison, granite dealer, 53 West Jackson boulevard, Chicago, is said to have thoroughly investigated the deposit as to quality and amount. A power plant is being completed in the vicinity and electric power for operation will be available in December.

Cement

Texas Portland Cement Co., Dallas, Tex., celebrated Armistice Day with an old-fashioned barbecue, held at Cement City.

Cyrus S. Avery, 15 West Seventh street, Tulsa, Okla., is interested in the organization of a $1,500,000 cement manufacturing company.

Indiana Portland Cement Co., Indianapolis, Ind., announces that it will remove its offices from the State Life building to 808 Continental National Bank building, 17 North Meridian street and Circle, on December 1.

Wolverine Portland Cement Co., Coldwater, Mich., has declared a dividend of 5%, payable December 15, of record December 5. The last dividend paid was 1½% on November 15, and makes a total of 16% paid for 1924.

Missouri Portland Cement Co., St. Louis, Mo., has purchased six acres on Natural Bridge road and the Terminal Railway tracks, to be held in reserve for expansion purposes. Meantime the ground will be occupied by the company as yards. The tract has a frontage of 442 ft. on the south side of Natural Bridge road by a depth of 520 ft., and a frontage on the Terminal Railway of 325 ft.

Cement Products

Canadian Concrete Products Co. will erect a factory at Belleville, Ont., for supplying the Canadian market.

J. A. McConnell, of the Winfield Concrete Pipe Co., Winfield, La., has leased a site and will put up a concrete pipe factory in Natchitoches, La.

T. H. Callahan is reported to have purchased the interest of H. A. Jansen in the Medford Cement Brick and Block Works, Medford, Ore.

Florida-McCracken Concrete Pipe Co., Tampa, Fla., contemplates doubling the capacity of its plant at 43rd and Main avenue. W. J. McCracken, president, Box 872.

River Rock, Sand and Gravel Co., Stockton, Calif., bidding $1.40 per ton, was awarded the contract to furnish approximately 5000 tons of concrete mix, to be used in canal construction, to the South San Joaquin Irrigation District.

Lime

Western Lime and Cement Co., at the foot of James street, Green Bay, Wis., has now almost completed the concrete work on the new addition to the chemical lime plant, and the kilns will probably be ready for use before the end of the year. Two kilns are being added to the three already functioning at the plant. The lime is used in making paper, and the rock used is brought over by boat from Michigan, and a large supply is now on hand ready for use.

Gypsum

American Gypsum Co., Port Clinton, Ohio, has awarded contract to the Austin Co. for a new plaster plant in Cleveland. It will be a steel frame structure 60x130 ft.

Personals

T. K. Nickerson, of the Pacific Building Material Co., East Second and Main streets, Portland, Ore., was a recent visitor to the San Francisco Builders' Exchange. Mr. Nickerson was on a tour of California to investigate the latest types of ready-mixed mortar plants. He plans early construction of such a plant in the "Rose City."

F. W. Glauser has been appointed by the Hyman-Michaels Co., of Chicago, Ill., manager of its equipment department for the southern territory of the company with headquarters in St. Louis, Mo. Mr. Glauser was formerly associated with the Mid-Continent Equipment and Machinery Co., of St. Louis, and his wide experience in railroad work fits him well for serving the railway equipment field.

E. B. Nickles, chief engineer of the Manitowoc Portland Cement Co., addressed the monthly noon luncheon of the Milwaukee Builders' and Traders' Exchange, November 6. Mr. Nickles gave the history of the manufacture of cement since the discovery of the process in England. He said that the inventor, finding the grinding of limestone, one of the ingredients, difficult, used to scrape the limestone dust from the streets about his home. The growth of the use of portland cement in the United States, particularly during the decade 1910-1920, was phenomenal. The output in this country last year was 137,000,000 bbl.

Obituary

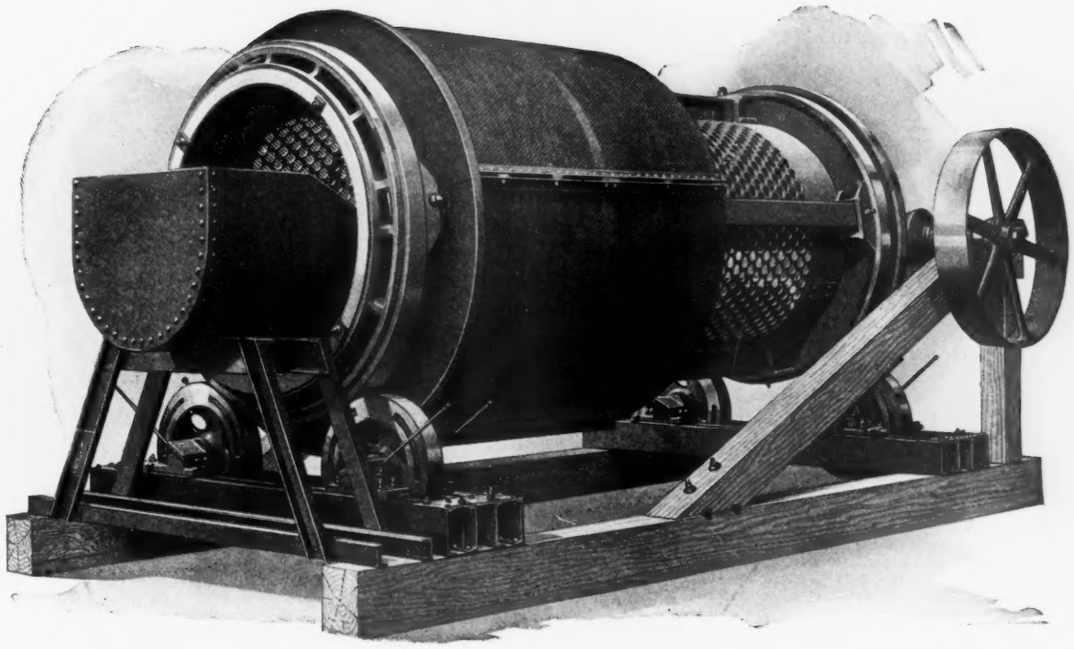
Frank Barr Knight, engineer and manager of the Chicago branch of the Lidgerwood Manufacturing Co., died suddenly of heart failure on October 12 at his residence at Highland Park, Ill. Mr. Knight was born in Worcester, Mass., on February 13, 1872. He was graduated from the Worcester Polytechnic Institute in 1892 and was engaged to enter the employ of the Lidgerwood company a few weeks prior to his graduation. He was with the company from 1892 until his death. He first entered the cableway department as a draftsman and later was trained as a cableway erector. In 1908 he was made manager of the Chicago branch of the company. Mr. Knight's work brought him in contact with every phase of cableway design, construction and operation. He made several improvements in cableways, notably excavating buckets and aerial dumping appliances, and he was the author of several articles on the subject of cableways.

Manufacturers

Sullivan Machinery Co., Chicago, Ill., announces the establishment of a branch office and warehouse in Los Angeles, Calif., at 412 East Third street, with Benjamin P. Lane as local manager. A complete stock of air compressors, hammer drills, concrete breakers and air-lift equipment will be carried, as well as spare parts and supplies for them.

Foote Bros. Gear and Machine Co., Chicago, Ill., announces that it has been making a number of improvements in its manufacturing equipment during the past year. Machines of older types have been discarded and replaced with more modern equipment in many departments and the whole plant brought up to the top notch of efficiency. One of the interesting additions to the present equipment is an elaborate and expensive machine for the grinding of spur-gear teeth.

Screening Equipment



To meet the requirements of modern rock crushing plant operators, Allis-Chalmers have designed and successfully installed their Style "B" Open End Revolving Screens.

You will find the same rugged construction which characterizes all of Allis-Chalmers products thru a half century of experience. Allis-Chalmers screens will win for you in the long run. A complete line of screens including the "Allis-Chalmers Compensated Type Shaking Screens."

Let our engineers figure on your requirements
Write for estimates

ALLIS-CHALMERS PRODUCTS
Electrical Machinery
Steam Turbines
Steam Engines
Gas and Oil Engines
Hydraulic Turbines
Crushing and Cement Machinery
Mining Machinery

ALLIS-CHALMERS MANUFACTURING COMPANY
MILWAUKEE, WISCONSIN, U.S.A.

Offices in All Principal Cities

ALLIS-CHALMERS PRODUCTS
Flour and Saw Mill Machinery
Power Transmission Machinery
Pumping Engines-Centrifugal Pumps
Steam and Electric Hoists
Air Compressors - Air Brakes
Agricultural Machinery
Condensers

Traffic and Transportation

By EDWIN BROOKER, Consulting Transportation and Traffic Expert,
Munsey Building, Washington, D. C.

Proposed Changes in Rates

THE following is a continuation of the latest proposed changes in freight rates up to the week beginning November 10, some of the November 10 rates having been included with those of October 25 in November 15 ROCK PRODUCTS:

Southern Freight Association Docket

16829. Sand. It is proposed to cancel present commodity rate of $1.47 per net ton on sand (other than molding) and gravel, carloads, from Memphis to Nashville, Tenn., as published in Agt. Speiden's I. C. C. 702, account of no movement. Class A rate of 29 cents per 100 lb. to apply after cancellation.

16840. Gravel. Carloads, from Camden, Tenn., to Ryan, Ky. Present, 95 cents; proposed, 79 cents per net ton, same as rate in effect to Hickman, Ky.

16842. Sand and gravel. It is proposed to revise the rates on sand and gravel, carloads, from Nashville, Tenn., to Ohio River crossings and L. & N. R. R. stations in Kentucky and Tennessee to be the same as rates on sand and gravel from and to other points on the L. & N. R. R. for similar distances. A statement showing the present and proposed rates will be furnished interested parties upon request.

16844. Stone, marble or slate, broken or crushed. Carloads, from Tellico Plains, Tenn., to Atlanta, Ga. Present, 52 cents per 100 lb. (Class A); proposed, $1.40 per net ton. (Not to include switching at destination.) Proposed rate made same as rates on this commodity from and to other points on the L. & N. R. R. for similar distances.

16853. Sand and gravel, other than molding. Carloads, from Henderson and Major, Ky., to Nashville, Tenn. Present, $1.31; proposed, $1.21 per net ton, same as in effect from Paducah, Ky.

16856. Cement. Carloads, from Cape Girardeau, Mo., to Nortonville, Gracey, Hopkinsville, Central City, Fordsville and Elizabethtown, Ky. Cairo and Paducah combination now applies. Proposed, same as in effect from St. Louis, Mo.

16885. Sand and gravel. It is proposed to reduce the present rates on sand and gravel, carloads, from Montgomery, Ala., to points named below to be as follows: To Clinton, S. C., $1.94; Greenville, S. C., and Greenwood, S. C., $1.89; Spartanburg, S. C., $1.94 per net ton, the proposed rates being based on the scale submitted by carriers to the Alabama-Georgia Public Service Commissions.

16893. Gravel. Carloads, from Crews and Sulligent, Ala., to Byhalia, Victoria, Red Banks and Mahon, Miss. Mileage rates now apply. It is proposed to reduce present rates to be $1.21 per net ton, made with relation to present rate from Bigbee, Miss.

16907. Sand. Carloads, from Harian, Ky., to Baxter, Ky. Present, 4½ cents; proposed, 3½ cents per 100 lb., same as rate from and to other points on the L. & N. R. R. for similar distances.

16920. Cement. Carloads, from Nashville, Tenn., to stations on the L. H. & St. L. Ry. Combination rates now apply. It is proposed to establish commodity rates made in line with rates from and to other points to approximately the same distance. Statement of proposed rates will be furnished interested parties upon request.

16941. Stone, crushed. Carloads, minimum weight 40,000 lb.; whitestone, powdered, carloads, minimum weight 40,000 lb., from Whitestone, Ga., to LaGrange, Ga. Combination rates now apply. Proposed, $1.58 per net ton, same as present rate to West Point, Ga.

16945. Cement. It is proposed to establish rates on cement, carloads, from Kinsgport, Tenn., to branch line stations on the Eastern Kentucky and Cumberland Valley Divisions of the L. & N. R. R. on basis of the Fourth Section Committee's cement scale, observing present rates to junction points as minima. The proposed revision represents reductions.

16947. Crushed stone. Carloads, minimum weight marked capacity of car, from Columbia and Cayce, S. C., to Fiftone, Fla. Present, $1.82 per net ton; proposed, $1.76 per net ton.

16986. Sand and gravel. Carloads, from Gravel Pit and Lillington, N. C., to Fayetteville, N. C. Class A rate of 14½ cents per 100 lb. now in effect for interstate application; proposed interstate rate, 70 cents per net ton, same as now applicable intrastate between the same points.

16994. Stone, broken or crushed, and agricultural stone, carloads. It is proposed to revise the present rates from Franklin and Carters Creek, Tenn., to L. & N. R. R. Main Stem, Memphis Line, Owensboro and Nashville Division and Henderson Division stations to reflect the basis observed from and to other points on the L. & N. R. R. for similar distances. Statement of present and proposed rates will be furnished interested parties upon request.

16995. Lime. It is proposed to cancel present commodity rate of 22½ cents per 100 lb. on lime, common hydrated, quick or slaked, L. C. L., from New Orleans, La., to L. & N. R. R., N. O. & M. Division stations; Pascagoula, Miss., to Rigolets, La., inclusive, as published in L. & N. R. R. I. C. C. A15210, account of no movement. Class rates to apply after cancellation.

16996. Cement. It is proposed to establish commodity rates on cement, carloads, from Nashville, Tenn., to L. & N. R. R. stations in Kentucky and Tennessee where class rates obtain at present, made same as rates from and to other points on the L. & N. R. R. for similar distances. Statement of proposed rates will be furnished interested parties upon request.

17009. Cement. Carloads, from Nashville, Tenn., to stations on the C. N. O. I. T. P. Ry. between Chattanooga, Tenn., and Junction City, Ky. It is proposed to reduce the present rates to basis of joint line scale as proposed by the Fourth Section Committee, for actual distance, observing the present rates to Junction City, Ky., as maxima. The proposed rates range from 14 cents to Dixon, Tenn., up to 17 cents per 100 lb. to Bowen, Ky.

17020. Sand. Carloads, minimum weight 40,000 lb., from Prattville Junction and Jackson's Lake, Ala., to Spencer's Quarry, Ala. Present, $17.50 per car (116⅔ cents per net ton); proposed, 94 cents per net ton (intrastate only), made in line with rates from competing points.

17038. Stone, broken or crushed, carloads. It order to avoid confusion, it is proposed to publish rates on stone, broken or crushed, carloads, between points on the Atlanta Division of the N. C. & St. L. Ry. in Georgia based on the June 24, 1918, rates brought up to date, in lieu of the present rates, which are the Class P rates in connection with Agt. Speiden's Trf. 75D.

17043. Sand and gravel. Carloads, from Montgomery, Ala., to Bonaire, Ga. Present, $2.07; proposed, $1.67 per net ton, based on the proposed Alabama-Georgia joint line scale for distance of 213 miles.

Southwestern Freight Bureau Docket

2679. Cement. To establish the following rates on cement, hydraulic or portland, carloads, as described in Santa Fe System Trf. 7552G, minimum weight 50,000 lb., except when marked capacity of car used is less, the actual weight, but not less than 40,000 lb., will apply. Orders for cars of less than 50,000 lb. will not be accepted by the carriers (same as in Item 40C, Santa Fe System Trf. 7552G):

From Chanute, Kan., Fredonia, Kan., Humboldt, Kan., Independence, Kan., Iola, Kan., to (Texas) Magoun, 23½; Follett, 23½; Sherlock, 23½; Darrouzett, 23½; Gaylord, 23½; Booker, 23½; Huntoon, 23½; Twichell, 25½; Perryton, 25½; Lord, 25½; Farnsworth, 25½; Waka, 27½; Spearman, 27½.

From Dewey, Okla., Ada, Okla., Bonner Springs, Kan., Sugar Creek, Mo., Superior, Neb., to (Texas) Magoun, 28½; Follett, 28½; Sherlock, 28½; Darrouzett, 28½; Gaylord, 28½; Booker, 28½; Huntoon, 28½; Twitchell, 30½; Perryton, 30½; Lord, 30½; Farnsworth, 30½; Waka, 33; Spearman, 33. It is stated that as a result of reductions to Shattuck and Touzalin, Okla., and also cross-country stations in Oklahoma, consignees find themselves unable to buy and sell cement in competition with dealers at the Oklahoma stations and request equitable rates.

2737. Cement. To establish the following rates on cement, carloads, as described in S. W. L. Trf. No. 90E, from Harrys and Eagle Ford, Texas, to stations on the A. & L. M. Ry. (Rate in cents per 100 lb.)

Raws to Crossett, Ark., including Huttig, Ark.	20½
Geddie, La., to Monroe, La., inclusive, including Dollar Jct., La.	20

Shippers at Harrys and Eagle Ford, Texas, feel that they are being discriminated against when shipping to points on the A. & L. M. Ry., when compared with rates from Ada, Okla., and Cape Girardeau, Mo., and desire rates established on a more equitable basis.

2776. Sand and gravel. To establish the following rates on sand and gravel, carloads, minimum weight marked capacity of car, but not less than 80,000 lb., from Ft. Gibson, Kriener and Verkney, Okla., to points in Arkansas and Missouri, etc., on the St. L.-S. F. Ry., north of Van Buren, Ark. (Rates in cents per 100 lb.)

60 miles and over	55		4
65 miles and over	60		5
70 miles and over	65		5
75 miles and over	70		5
80 miles and over	75		5
85 miles and over	80		5½
90 miles and over	85		5½
95 miles and over	90		5½
100 miles and over	95		5½
105 miles and over	100		5½
110 miles and over	105		5½
115 miles and over	110		6½
120 miles and over	115		6½
125 miles and over	120		6½
130 miles and over	125		6½
135 miles and over	130		7
140 miles and over	135		7
145 miles and over	140		7
150 miles and over	145		7
160 miles and over	150		7
170 miles and over	160		7

Shippers contend that the present scale of rates to points in northwestern Arkansas results in much higher transportation cost than when similar material moves from points in the Joplin District, and that they are unable to compete.

Crushed Stone Freight Reparation

AN award of reparation on account of unreasonable rates and a waiver of undercharges have been made in No. 15504, Edwards Construction Co. et al. vs. Jonesboro, Lake City & Eastern et al., mimeographed, as to rates on crushed stone from Cape Girardeau, Mo., to Bowman, Ark. The commission found the rates assailed were unreasonable to the extent they exceeded 8 cents. The complaint alleged the rates charged on 63 carloads of crushed stone shipped between July 27, 1922, and January 10, 1923, were unreasonable and that the rate applicable was unreasonable and in violation of the aggregate of the intermediate clause of the fourth section. On most of the shipments, the commission said, a rate of 15.5 cents was charged; on others, a rate of 13.5 cents. The commission said a joint class E rate of 28.5 cents was applicable and that the shipments therefor were undercharged. Shortly after the first of these shipments was made a joint commodity rate of 8 cents was established, and freight bills are to be settled on that basis.—*Traffic World.*